Suid-Afrikaanse Tydskrif vir Geneeskunde : South African Medical Journal

Kaapstad, 11 Junie 1960 Deel 34 No. 24 Volume 34 Cape Town, 11 June 1960

CAT-SCRATCH DISEASE

JAMES MARSHALL, M.D., *Department of Dermatology, University of Stellenbosch*

Cat-scratch disease (*maladie des griffes de chat*, benign lymphoreticulosis) was first described as a clinical entity by Debré *et al.*[1,2] in 1950 and is characterized chiefly by lymphadenitis. The original cases were encountered in France and in the USA (by Foshay), but the disease is now known to occur in most parts of the world.

The majority of cases occur in children or young people, most of whom give a history of having been scratched or bitten by a cat. In the common variety of cat-scratch disease the incubation period between contact and the appearance of skin lesions (not always present) is from 3 to 14 days. The primary lesion is not characteristic and may be an inflamed scratch, an erythematous or even necrotic papule, or an impetigo-like patch. After 1 - 3 weeks the regional lymph glands enlarge to as much as 3 or 4 cm. in diameter and may soften and discharge sterile pus through the skin. Fever, malaise, generalized lymphadenitis and enlargement of the spleen may occur. In the early stages there may be fleeting generalized erythematous macular or papular eruptions, and erythema nodosum has often been noted. The course of the disease is towards spontaneous healing after from 4 days to as long as 6 months. Although cat-scratch disease usually occurs sporadically it is sometimes encountered in little epidemics within a family.

The pathological changes in the skin and lymph glands are suggestive without being diagnostic. The skin lesion is a granuloma with central necrosis. The earliest change in the lymph glands is a proliferation of reticulum cells and lymphocytes in the interfollicular medullary tissue.[3] This is followed by the establishment of a vascularized area of reticulum-cell proliferation surrounded by a limiting zone of lymphoid cells. Next appear micro-abscesses consisting of an aggregate of polymorphonuclear leukocytes in the centre of reticulum cells. Finally there appear foci of fibrinoid necrosis in which are nuclear debris and pyknotic cells. The necrotic areas are bounded by a mantle of proliferating reticulum cells around which is a zone of lymphoid cells. The structure of the gland is preserved, but there is a generalized infiltrate of plasma cells and histiocytes. The germinal follicles show evidence of inflammatory stimulation and there is slight sinus catarrh. Blank *et al.*[4] note that giant cells may be found in the region of the focal lesions and that there may be an appearance suggesting tubercle formation.

Confirmation of the diagnosis of cat-scratch disease is obtained by a skin test using Tyndallized pus or other lymph-gland material. Intradermal inoculation of 0·1 ml. of the antigen evokes, usually within 48 hours, a papule 5 - 15 mm. in diameter, sometimes with central necrosis and a halo of erythema; skin sensitivity persists for months or years after an attack.

Although several hundred cases have been discovered since 1950 only 1 has been reported in South Africa.[3] Prof. James Murray kindly searched the records of the South African Institute for Medical Research, in Johannesburg, and informs me that a tentative diagnosis of cat-scratch disease has been made in 13 cases since 1956; in only 2 or 3 cases had a skin test been carried out.

Case Report

A White man, aged 25 years, presented with an eruption on the left side of the forehead which had been present for 3 days. There were 3 little elevated, erythematous, succulent-looking plaques about 10 mm. in diameter, one studded with tiny vesicles, in a horizontal line above the left eyebrow. The left pre-auricular lymph gland was visibly enlarged and slightly tender. Five days later the skin lesions, treated with aureomycin ointment, were unchanged, but there was a discrete, tender enlargement of the lymph glands, to as large as 2 cm., in the anterior and posterior triangles of the left side of the neck and in both axillae. There were no general symptoms and the spleen was not enlarged.

The glands in the axillae subsided after 1 week, those in the neck after 2 weeks, without any systemic treatment. The skin lesions healed in 2 weeks leaving obvious pock marks.

Cat-scratch disease was suspected when the regional and axillary glands became enlarged, and the patient recalled that he had allowed a cat to clamber about his shoulders a week before the skin lesions appeared; he had not been clawed or bitten. Gland biopsy was not permitted. A supply of cat-scratch antigen was obtained from the Virus Reference Laboratory, London, and an intradermal injection of 0·1 ml. was given 6 weeks after all signs had disappeared. No reaction was apparent after 2 days. The patient departed on holiday, but reported that on the 6th day there had appeared a red swelling about 10 mm. in diameter, and when he was seen on the 16th day there was an infiltrated, pink papule 6 mm. in diameter. The papule finally disappeared after a month.

DISCUSSION

The Clinical Syndromes

In the typical case there is regional enlargement of lymph glands, sometimes accompanied by generalized lymphadenopathy. A primary lesion or the remains of cat scratches or bites may be found. Any gland group may be affected, but those draining the arms suffer oftenest. Suppuration occurs in about 30% of cases; persistent draining sinuses are rare. Hodgkin's disease, tuberculous adenitis, sarcoidosis, lymphogranuloma venereum, infectious mononucleosis, and tularæmia must be considered in the differential diagnosis.

When the inguinal glands are involved (pseudo-venereal type) the picture may be clinically indistinguishable from that of lymphogranuloma venereum.

Cat-scratch disease is one of the causes of Parinaud's oculoglandular syndrome of conjunctivitis and enlargement of the homolateral pre-auricular lymph gland.[5] The common causes for this syndrome are leptotrichosis, tularæmia, and tuberculosis; rarer causes are syphilis, lymphogranuloma

venereum, sarcoidosis, glanders, Newcastle virus infection, sporotrichosis, and rhinosporidiosis.

In the pharyngeal, or anginal, syndrome it appears that the infection occurs through the nasopharynx.

The mesenteric glands may be involved and give symptoms suggestive of appendicitis, and in a thoracic syndrome enlargement of the mediastinal glands and atypical pneumonia have been described.

Involvement of the nervous system may accompany a glandular syndrome, with symptoms indicative of encephalitis, myelitis, meningitis, or neuritis, e.g., convulsive crises, coma, pains of the causalgia type, and diminution of the reflexes and of muscular power.[6]

The disease is preceded in over 80% of cases in most reported series by cat scratches or bites or by simple contact with the animal. The animal concerned is usually perfectly healthy and intradermal tests with human antigens are invariably negative. It seems likely that the cat is simply a mechanical carrier of the cause of the disease from some other source in nature, and that it is infectious for only a few days or weeks. In cases where the cat cannot be incriminated there may be a history of excoriation by thorns, bones, wood or metal objects, or of insect bites, and it is probable that the causative agent is widespread in nature.

Attempts have been made to transmit cat-scratch disease to a variety of animals, but only some monkeys are susceptible. The disease in monkeys is similar to that in man. Mollaret *et al.*[7-12] discovered granulocorpuscles in the cytoplasm of reticulum and plasma cells in early lesions in monkey lymph glands and state that similar inclusions can be found, with difficulty, in human lymph glands. Winship,[13] however, points out that such inclusions can be found in lymph glands in a variety of diseases.

The cause of cat-scratch disease has not been isolated, but Mollaret *et al.*[7-12] believe it to belong to the lymphogranuloma venereum and psittacosis group of micro-organisms. The basis for this theory is the pathological picture, the finding of intracellular inclusions in lesions in man and experimental animals, and the occurrence in some cases of positive complement-fixation tests with lygranum (lymphogranuloma-venereum antigen). The cross-reaction with lygranum has not always been confirmed by other observers, and Armstrong *et al.*[14] believe that the positive reactions which occur in a minority of cases are related to the age of the patient, are of no diagnostic value, and cannot be interpreted as evidence that cat-scratch disease belongs to the lymphogranuloma venereum and psittacosis group. Manning and Reid[15] found that the incidence of positive complement-fixation tests to psittacosis antigen was 23% in 35 patients with positive cat-scratch skin tests and 60% in 10 cases with a histological diagnosis of cat-scratch disease; in a control series of normal blood donors the incidence of positives was 2%.

The skin test with cat-scratch antigen appears to be the most reliable method of confirming a clinical diagnosis. It is almost always positive during and for long after an attack. Performance of the test may reactivate healing or apparently healed lesions even when there is no local reaction to the injection. In a few typical cases the test has been negative, suggesting that more than one agent or type of agent may be involved. The incidence of positive skin tests in normal controls has been investigated. Bettley and Fairburn,[16] in a series of 40 cases, found that 3, who had contact with cats, gave positive reactions. Hunziker[17] found 2 positive reactors in a series of 50; both gave a history of adenopathy which might have been cat-scratch disease. Gifford[18] performed skin tests on 28 veterinary surgeons and found 7 who gave a positive reaction; only 1 had had the disease. It seems likely that positive reactions in normal controls may often indicate past inapparent infection. The Frei skin test for lymphogranuloma venereum is invariably negative in cases of cat-scratch disease. It is probable that cat-scratch antigen, like lymphogranuloma-venereum antigen, causes a reaction in subjects immunized by infection by virtue of its containing a specific component, in contradistinction to the non-specific reactions caused by lepromin[19] or Kveim[20] antigen, which are perhaps only foreign-body reactions that can be evoked in certain individuals or disease states.

Cat-scratch disease, particularly in its minor forms, must occur much more frequently than the records suggest, and it should be remembered when any case of inexplicable lymph-adenopathy is under investigation. A history of contact with cats and the histological picture in the lymph glands may suggest the diagnosis, but confirmation should be obtained by performance of the skin test.

Claims are often made that aureomycin or some other antibiotic has hastened cure, but the assessment of the value of therapy is obviously difficult in a disease which often subsides spontaneously in a few weeks.

SUMMARY

A case of cat-scratch disease in its typical form is reported. The literature is reviewed, and the various clinical syndromes that may occur and the conditions they may simulate are described.

Dr. Patricia Bradstreet, Director of the Standards Laboratory, Central Public Health Laboratory, London, kindly supplied the cat-scratch antigen.

REFERENCES

1. Debré, R., Lamy, M., Jammet, M. L., Costil, L. and Mozziconacci, P. (1950): Bull. Soc. Méd. Hôp. Paris, **66**, 76.
2. *Idem* (1950): Sem. Hôp. Paris, **26**, 1895.
3. Dreosti, A. E. and Murray, J. F. (1953): S. Afr. Med. J., **27**, 81.
4. Blank, H. and Rake, G. (1955): *Viral and Rickettsial Diseases of the Skin Eye and Mucous Membranes of Man.* London: Churchill.
5. Levitt, J. M. (1957): J. Amer. Med. Assoc., **165**, 1955.
6. Debré, R. and Job, J. C. (1954): Acta paediat. (Uppsala), **43**, suppl. 96.
7. Mollaret, P., Reilly, J., Bastin, R. and Tournier, P. (1950): Bull. Soc. Méd. Hôp. Paris, **66**, 423.
8. *Idem* (1950): *Ibid.*, **66**, 687.
9. *Idem* (1950): Presse méd., **58**, 282.
10. *Idem* (1950): *Ibid.*, **58**, 1353.
11. *Idem* (1951): *Ibid.*, **59**, 681.
12. *Idem* (1951): *Ibid.*, **59**, 701.
13. Winship, T. (1953): Amer. J. Clin. Path., **23**, 1012.
14. Armstrong, C., Daniels, W. B. MacMurray, F. G. and Turner, H. C. (1956): J. Amer. Med. Assoc., **161**, 149.
15. Manning, J. D. and Reid, J. D. (1958): Amer. J. Clin. Path., **29**, 430.
16. Bettley, F. R. and Fairburn, E. (1953): Lancet, **1**, 520.
17. Hunziker, N. (1958): Acta allerg. (Kbh.), **12**, 311.
18. Gifford, H. (1955): Ann. Intern. Med., **95**, 828.
19. Kooij, R. and Gerritsen, T. (1956): Int. J. Leprosy, **24**, 171.
20. Kooij, R. (1958): Dermatologica (Basel), **117**, 336.

BOEKE ONTVANG : BOOKS RECEIVED

Atlas der gynäkologischen Operationen. Von Prof. Dr. O. Käser und Dr. A. Iklé. 451 Seiten. 720 Abbildungen. Ganzleinen DM 148.-. Stuttgart: Georg Thieme Verlag. 1960.

Essentials of Fluid Balance. 2nd edition. By D. A. K. Black, M.D., F.R.C.P. Pp. xii + 135. 6 figures. English price 20s. Oxford: Blackwell Scientific Publications, Ltd. 1960.

Suid-Afrikaanse Tydskrif vir Geneeskunde : South African Medical Journal

VAN DIE REDAKSIE : EDITORIAL

DIE GEMEENSKAP EN DIE WEDUWEE

Die algemeen aanvaarde styl en patroon van die Westerse gesinslewe het so 'n vorm aangeneem dat daar 'n heel nuwesoortige probleem ontstaan het, naamlik die betreklike groot groep weduwees in die samelewing. In die jongste tyd het daar reeds al uit verskillende oorde besprekinge gekom wat die aandag van verantwoordelike lede van die samelewing op hierdie probleem vestig.[1-3] Die probleem het egter so 'n groot omvang, en ook sulke belangrike implikasies, dat dit ook hier verdere bespreking regverdig.

Laat ons nou eers begin deur navraag in te stel na die maatskaplike en geneeskundige faktore wat aan die grond lê van hierdie probleem. In die eerste plaas is daar die statistiese feit dat die gemiddelde lewensverwagting van vrouens 'n paar jaar langer is as dié van mans en dat die meeste vrouens om hierdie rede alleen 'n tydperk van weduweeskap kan verwag. Daarby kom die vasgewortelde maatskaplike gebruik dat mans gewoonlik gemiddeld 'n hele paar jaar ouer is as hulle vrouens wanneer hulle trou. Daar is dikwels 'n verskil van drie, vier, of vyf jaar tussen die ouderdom van mans en vrouens, en soms selfs 'n verskil van tien jaar of meer. 'n Vrou wat by die huwelik tien jaar jonger is as haar man staan dus voor die moontlikheid van 'n betreklike lang tydperk van weduweeskap. Oor die algemeen is die feitlike toestand van sake so dat daar in die meeste Westerse lande drie keer meer weduwees as wewenaars is.[1]

Omdat die samelewing bewus is van sy verpligtinge teenoor persone en groepe persone wat spesiale hulp nodig het, het allerlei adviserende en noodlenigings-organisasies ontstaan. Maar tot dusver het die weduwees as groep betreklik verwaarloos gebly. In sy inleiding tot die boek van Marris[2] som dr. John Bowlby die toestand van sake in algemene terme soos volg op:

> . . . . om 'n weduwee te word beteken om met dubbele slae geslaan te word, (aangesien) sowel leed as armoede die lot van die weduwee is . . . Smart ontsien geen persoon nie. Of die beproefde oud of jonk of ryk of arm is, die verlies van iemand aan wie 'n mens intiem verbonde was, lei tot emosionele ontreddering. Dit is nie net die uiterlike lewe van so 'n persoon wat getref word nie, maar sy word ook blootgestel aan intense botsende impulse—om te onthou of om te vergeet; om te blameer of om te vergewe; om geselskap op te soek of om dit te vermy, (ens.) . . . Hierdie omstandigheid kan goedskiks die oorsaak wees van die agteruitgang van liggaamlike en geestesgesondheid. Die probleem is om die aard van die prosesse te verstaan wat by die verlies van 'n geliefde ontstaan, en om kennis te dra van die behoudende faktore en prosesse in hierdie verband . . .'

Daar bestaan geen twyfel nie dat baie weduwees op hul eie hulle probleme te bowe kom. Vir 'n groot aantal van hulle is daar egter so baie ernstige probleme dat hulp en leiding onontbeerlik is. As voorbeelde van gevalle met spesifieke probleme kan ons die volgende noem: Die weduwee met kinders moet dadelik moeder, huishoudster, en broodwinner word. Tensy sy spesiale opleiding gehad het, is die probleem van die verdien van inkomste soms baie ernstig. En as sy klein kindertjies het, staan sy dadelik voor die konflik om te werk en haar kinders aan verwaarlosing bloot te stel, of om finansiële ontbering te ly. Vir die vrou wat effens ouer is, is daar die probleem van die finansiëring van die opvoeding van haar kinders. Emosionele probleme is ook legio by kinders wat net met een ouer grootword. Die middeljarige en ouerige vrou wat finansieel swak agtergelaat is, vind dit soms moeilik of selfs heeltemal onmoontlik om 'n opening in die arbeidsmark te kry. Dit is soms een van die moeilikste dinge ter wêreld vir 'n bejaarde vrou om werk te soek en te vind.

Om al hierdie redes, en om baie ander ongenoemde redes, is dit noodsaaklik dat daar meer sistematies gedink moet word in terme van konstruktiewe hulp aan weduwees.

Die geneesheer en veral die algemene praktisyn is een van die belangrikste onmiddellike skakels in hierdie verband. Hy het gewoonlik met die siekte en die dood in die gesin te doen, en hy is gewoonlik die eerste persoon wat op die toneel kom. Hy kan baie doen om die nood van die oomblik te verlig en te versag, maar daar is eintlik veel meer aan hulp en bystand nodig as wat hy wel kan gee.

Om hierdie rede het daar dan ook in Engeland 'n organisasie tot stand gekom wat bekend is as die ‚Cruse Club' wat dit hom ten doel stel om leiding en hulp en advies op allerlei gebiede (emosioneel, finansieel, regtelik, ens.) aan weduwees te verleen. Die ‚Cruse Club'-eksperiment is prysenswaardig en navolgingswaardig. Dit is iets waaraan die leidende welsynsorganisasies in ons eie land sonder verwyl aandag behoort te gee.

Die instelling van 'n hulpdiens—soos dié waarna ons nou net verwys het—aan vroue wat op hierdie manier swaar getref word, kan nog een meer skakel word in die pogings van 'n beskaafde gemeenskap om die las en bekommernis van sy minderbevoorregte of ongelukkige lede te verlig. Laat ons as 'n gemeenskap nie wegskram van ons verantwoordelikheid op hierdie gebied nie.

1. Torrie, A. (1960): Brit. Med. J., **1**, 1267.
2. Marris, P. (1958): *Widows and their Families*. Londen: Kegan Paul.
3. Pollard, R. S. W. (1959): *Family Problems and the Law*. Londen: Delsile.

CATS AND LYMPH GLANDS

In this issue of the *Journal* we publish a report on a case of cat-scratch disease. In the ten years since cat-scratch disease was first described only one other case has been reported in South Africa.[1] There is a wealth of literature on the disease, which has been recognized in most parts of the world, and it is certain that the incidence of the disease in this country is far greater than is reflected in these publications.

In typical cat-scratch disease regional enlargement of lymph glands, sometimes accompanied by generalized lymphadenopathy, follows cat scratches or bites or even

simple contact with the animal; and fever, malaise and fleeting rashes may occur in the early stages. The enlarged glands, which may suppurate, subside spontaneously within a few weeks or months. Other syndromes that may occur are the pseudo-venereal (inguinal glands), ocular (giving one variety of Parinaud's oculoglandular syndrome), pharyngeal, mesenteric and thoracic. Any of these glandular syndromes may rarely be accompanied by evidence of involvement of the nervous system and symptoms indicative of encephalitis, myelitis, meningitis, or neuritis.

With such an astonishing variety of manners of presentation it is obvious that cat-scratch disease may have to be considered in the differential diagnosis of many common and uncommon diseases, especially those in which regional enlargement of lymph glands is a feature.

Apart from its relatively short course, cat-scratch disease bears a close resemblance to lymphogranuloma venereum, and there are indications that it may be caused by a micro-organism of the lymphogranuloma venereum and psittacosis group. Although contact with cats features in the history of most cases, there are others in which this factor can be excluded, the disease following trauma by a variety of disparate inanimate agents. The cat does not suffer from the disease, and it is presumed that it is simply the commonest carrier of the causative agent which must be widespread in nature.

A diagnosis of cat-scratch disease may be suggested by the clinical signs and histopathological appearances in affected lymph glands, but confirmation rests on the results of an intradermal test using Tyndallized pus or other lymph-gland material. Cat-scratch antigen is not available in South Africa and anyone investigating a suspect case should try to provide the local virus research laboratory with material suitable for its preparation.

1. Dreosti, A. E. and Murray, J. F. (1953): S. Afr. Med. J., 27, 81.

MALIGNANT DISEASE IN THE TRANSVAAL:* VII. CANCER OF THE GENITO-URINARY SYSTEM

FIRST STATISTICAL REPORT OF THE RADIATION THERAPY DEPARTMENT OF THE JOHANNESBURG GROUP OF HOSPITALS

N. G. DE MOOR, D. DURBACH, LIONEL COHEN and P. KEEN, *Johannesburg*

This is the fourth article in the series dealing with malignant disease in the Transvaal, as seen in the Radiation Therapy Department of the Johannesburg Hospital. The following systems have already been analysed: skin,[1] muscular and skeletal system, respiratory tract,[2] vascular system, haemopoietic and reticulo-endothelial system, and alimentary tract.[3]

In the previous articles in this series important racial differences were noted, and the same has been found in this analysis of malignancy in the genito-urinary system.

The cases of tumour of the genito-urinary system referred to the radiotherapy department during the 10 years 1949 - 58 are classified in Tables I and II. The analysis in this article is largely based on the figures in these tables.

CARCINOMA OF THE OVARY

A total of 186 cases of ovarian cancer were referred for radiotherapy during the 10-year period. Of these, 152 occurred among Europeans, and 34 among Bantu patients. The European predominance in ovarian cancer contrasts markedly with other genito-urinary tumours, notably carcinoma of the cervix, which is far commoner in African women (Table I).

More than 75% of the European cases occurred in the 5th, 6th and 7th decades. Dysgerminoma and teratoma, however, occurred in younger patients, aged from 6 years to 25 years. In the non-European series 74% occurred in the 3rd, 4th and 5th decades, thus confirming the general tendency towards a younger age susceptibility in the Bantu. (Table II.)

Pathology. By far the commonest malignant ovarian tumour was the papillary serous cystadenocarcinoma, which accounted for 66% of the total. Next commonest was malignant pseudomucinous cystadenoma, which was present in 18% of the cases. 'Miscellaneous' malignant tumours, including dysgerminoma, teratoma, granulosa-cell tumour,

TABLE I. TUMOURS OF THE GENITO-URINARY SYSTEM BY SITE, PATHOLOGY, RACE AND SEX

Organ	*Pathology*		*Eur.*	*Afr.*	*Total*
Ovary	Serous cystadenocarcinoma		100	23	123
	Pseudomucinous cystadenocarcinoma		28	6	34
	Miscellaneous ovarian tumours		24	5	29
Uterus (body)	Adenocarcinoma		80	17	97
	Chorionepithelioma		1	1	2
Cervix	Squamous carcinoma		305	540	845
	Anaplastic tumours		21	52	73
	Adenocarcinoma		13	30	43
Vagina	Squamous carcinoma		2	2	4
Vulva	Squamous carcinoma		8	4	12
Mesenchyme	'Sarcoma'		14	5	19
Testis	Seminoma		18	6	24
	Teratocarcinoma		17	2	19
	Chorionepithelioma		2	0	2
Penis	Squamous-cell carcinoma		13	34	47
Kidney	Nephroblastoma	M	6	12	44
		F	6	20	
	Adenocarcinoma	M	32	8	62
		F	17	5	
Bladder	Papillary carcinoma	M	42	2	56
		F	10	2	
	Transitional-cell carcinoma	M	56	5	72
		F	11	0	
	Squamous-cell carcinoma	M	17	13	36
		F	4	2	
Total			847	796	1,643

* The previous articles in this series were published in this *Journal* of 22 November 1952, 29 January 1955, and 29 June 1957. This is expected to be the penultimate article in the series.

TABLE II. DISTRIBUTION BY SITE, RACE AND AGE

Age	Ovary		Uterus		Cervix		Testis		Penis		Kidney		Bladder		Total		
	Eur.	*Afr.*	*Eur.*	*Afr.*	*Eur.*	*Afr.*	*Eur.*	*Afr.*	*Eur.*	*Afr.*	*Eur.*	*Afr.*	*Eur.*	*Afr.*	*Eur.*	*Afr.*	*Total*
0 - 9	1	1	—	—	—	—	1	—	—	—	12*	30*	—	—	14	31	45
10 - 19	2	3	—	—	—	1	1	1	—	—	—	2*	—	—	3	7	10
20 - 29	9	4	—	—	7	14	7	1	—	1	1	2	—	1	24	23	47
30 - 39	12	10	4	—	48	174	15	4	—	6	3	4	4	6	86	204	290
40 - 49	31	9	6	—	81	187	11	1	2	9	13	3	12	10	156	219	375
50 - 59	42	3	19	4	97	117	0	—	1	9	16	1	17	5	192	139	331
60 - 69	39	0	33	5	71	75	1	—	5	7	8	3	44	1	201	91	292
70 - 79	5	1	18	1	21	24	0	—	4	—	5	—	46	1	999	27	126
80+	1	—	1	—	3	5	1	—	1	—	1	—	5	—	13	5	18
															787	747	1,534
Mean Age	52·0	36·9	62·2	62·0	52·7	47·6	36·9	32·1	65·8	49·7	56·4	43·2	65·2	45·9			

*These 44 cases excluded from calculated averages.

chorionepithelioma, and malignant degeneration in endometriomas, together constituted 8% of the series. A wide variety of tumours were classified as 'adenocarcinoma', or 'anaplastic carcinoma', which were mainly solid, and of indeterminate origin, deriving in all probability from silent growths elsewhere, and these accounted for the remaining 8% of cases (Table I).

Stage. The majority of cases were classified as 'late', owing to the tendency of these tumours to widespread dissemination throughout the peritoneal cavity. Gross local involvement of omentum, pelvic organs, metastatic glands and ascites were often concomitant features. Thus in many cases, owing to poor general condition, palliative therapy only was administered.

Treatment

Although the treatment of malignant disease of the ovary is primarily surgical, cases were referred to the radiotherapy department under the following circumstances: After complete removal of an ovarian tumour, proved on histological examination to be malignant; after primary incomplete surgery, with either residual tumour, rupture of cyst contents, or visible metastases in glands or liver; inoperable tumour, either clinically or at laparatomy; or for recurrence after surgery.

Regional X-ray therapy was administered whenever feasible, and field sizes adequate to subtend the macroscopic tumour-bearing area were prescribed. The dosage levels were generally of the order of 3,500 r in 4 weeks, if the disease did not extend beyond the pelvic brim; or 3,000 r in 4 weeks if the field extended to the level of the umbilicus; or somewhat smaller doses if the whole abdomen required irradiation. X-ray therapy was supplemented in certain cases by intraperitoneal radio-active colloid, 150 - 200 mc. of Au-198, or 10 - 15 mc. of colloidal P-32 (ziconium phosphate), as well as by intra-uterine and vaginal radium.

Encouraging results were evident in the 'early' cases, and in the 'late' cases marked growth restraint was achieved, together with worth-while palliation. One patient with widespread peritoneal dissemination is known to be alive and well after 5 years. The control of ascites for long periods by intraperitoneal radio-active colloid and nitrogen mustard was also achieved. Owing to poor follow-up and variation in natural history, it has been difficult to assess the survival rate in relation to the various therapeutic procedures.

CANCER OF THE UTERUS (BODY)

During the same period, 97 cases of carcinoma of the body of the uterus were referred to the radiotherapy department, of which 80 were Europeans and 17 Africans (Table I). Of the cases treated, 88% were over 50 years of age, in contrast to carcinoma of the cervix (Table II). There was no racial difference in age distribution, an unusual feature in view of the findings in other regions. With the exception of 2 chorionepitheliomas, the histological picture was invariably that of adenocarcinoma.

In the 'operable' cases primary surgery was generally accepted as the treatment of choice, particularly when fibroids or adnexal masses were present.

Cases were referred for radiotherapy under the following circumstances: patients regarded as poor-risk cases owing to old age, obesity, diabetes or hypertension, in which radium therapy proved to be a safe alternative method of curative treatment; for post-operative vaginal radium, to reduce the incidence of vaginal recurrence; for overt recurrence in the vagina and pelvic tissues; or for malignant ascites.

The method of primary radical treatment consisted of the introduction of radium in rubber containers, arranged to form a single linear source from the fundus of the uterus to the upper half of the vagina, delivering a dose of 10,000 r to the paracervical regions in about 10 days. For post-operative therapy, vaginal radium in the form of one or two ovoids were applied so as to deliver a dose of 6,000 r to the mucosa in 48 hours.

When the adenocarcinoma was found to be confined to the lowest portion of the uterus or the endocervical canal, with or without parametrial spread, a similar technique to that for carcinoma of the cervix was carried out.

The results of radium treatment of early cases of carcinoma of the body of the uterus have been excellent.

CARCINOMA OF THE CERVIX

During the 10-year period 961 cases of carcinoma of the cervix were referred for treatment, 339 Europeans and 622 Bantu. These figures indicate the extraordinary susceptibility of Bantu women to cancer in this site. It is by far the largest single group of tumours in our whole series, and although the proportion of Bantu patients presenting for treatment is little more than one-third of the total for neoplasms in all sites, they outnumber the European by almost 2 : 1 in this particular tumour. This is in sharp contrast with adeno-

carcinoma of the body of the uterus, where 82% of cases were Europeans (Table I).

The number of European cases referred during these 10 years has remained fairly constant, approximately 35 cases per year, but there has been a marked increase in the number of Bantu cases during the past 3 years, from 35 to 105 per year. Although this threefold increase in cases attending was not observed in any other tumour, with the exception of oesophageal cancer, it can probably be explained in part by the fact that a larger proportion of these cases are now attending hospitals.

There was little difference in the average age in the two race groups, viz. 53 years for Europeans and 48 years for Bantu (Table II).

A definite histological report was obtained in almost all cases, and of these 88% were squamous cancer, 7·6% anaplastic tumours, and 4·5% adenocarcinoma, the percentages of each type being similar in the two races (Table I).

The European patients sought advice at an earlier stage of the disease, 53% being classified as stage I or II, and only 27% as stage III, as compared with 34% stage I or II, and 46% stage III in the Bantu. In both races 20% of cases were classified as stage IV.

Treatment

Nearly all the European patients were treated primarily in the gynaecology departments, either surgically (12%) or with radium applications, and then referred for radiation therapy. The radium was applied either according to the Stockholm technique, or the modified Manchester method.

The Bantu cases all received the full course of treatment in the radiation therapy department, with the exception of 16 patients (2·6% of the total) who had undergone some surgical procedure first. The routine method of radium application was a modified Manchester technique, delivering about 7,000 r to the paracervical tissues in a continuous exposure over 6 days. This was the sole form of treatment in stage I and early stage II cases, and was combined with 'multiple-field beam-directed' X-ray therapy in late stage II, stage III and occasionally stage IV cases. Radical treatment was administered to 80% of the total number of patients.

Since 1957 intra-arterial chemotherapy combined with radiation therapy has been used in treating inoperable recurrent cases of cancer of the cervix. Re-irradiation of patients was reported by Murphy and Schmitz[4] and others, with a certain degree of success, and it was felt that in combination with intra-arterial nitrogen-mustard, it might prove of even greater value. The technique employed was as follows: A polythene catheter was inserted into the femoral artery under a local anaesthetic, and pushed cranially, to enable nitrogen-mustard to be injected into the aorta just above its bifurcation. In some of our earlier cases the catheter remained in position for 4 days, 10 mg. of nitrogen-mustard being injected daily, but it was later found more satisfactory to inject the whole quantity at the rate of 10 mg. every $\frac{1}{2}$ hour. In the more recent cases tourniquets were applied to both thighs during the injections. No untoward effects were encountered, apart from vomiting in 1 patient, and the haemoglobin and leukocyte levels remained fairly constant. A repeat course of radium therapy (5,500 r) was given 1 - 2 weeks after the injections, followed by external X-ray therapy only if the latter had not previously been administered.

Of the 17 very advanced cases (15 Bantu and 2 European) treated in this way, 8 are alive, 8 dead, and 1 not traced. Of the 8 living patients, 2 have survived over 18 months, are well, and have returned to work. Another is known to be well after 9 months. One treated 6 months previously, developed a vesico-vaginal fistula, which required surgery with construction of an ileal bladder, but remains fairly well at the present time. The other 4 patients have only been treated within the last 3 months. Of the patients who died, 7 showed advanced cancer at autopsy with involvement of pelvic organs and lymph glands. One patient, who died of intercurrent disease 1 month after the combined therapy with nitrogen-mustard and a moderate dose of X-rays, showed no macroscopic evidence of tumour at post-mortem examination.

CARCINOMA OF THE VAGINA

This is an exceedingly uncommon tumour, there being only 4 cases in our series. Two were African women in their third decade, and 2 were Europeans aged 35 and 70 years respectively. All were squamous-cell cancer, associated in one of the African women with bilharzia (Table I).

CARCINOMA OF THE VULVA

During the 10 years a total of 12 cases of carcinoma of the vulva were encountered, 8 in Europeans, 4 in Africans. Of the European patients 7 were over the age of 60, and 1 aged 50. The African cases were younger, 1 aged 30, 2 aged 40, and 1 aged 50. Nine were squamous carcinomas, 2 were anaplastic tumours, and 1 was a basal-cell carcinoma (Table I).

The paucity of cases referred for radiotherapy is due primarily to the rarity of this disease, and secondarily to the fact that this tumour responds unfavourably to radiotherapy. As the growth commonly arises upon a precancerous area of leukoplakia with a tendency towards multiple foci of origin, surgery (total vulvectomy) was the treatment of choice.

MESENCHYMAL TUMOURS OF FEMALE GENITAL TRACT

There were 19 cases of pelvic tumours reported as 'sarcoma', 14 in Europeans and 5 in African women (Table I). Of these, 14 were sarcomata of uterine muscle, and 3 arose in the cervix, 1 in the ureter and 1 in the ovary. The majority of cases, in both racial groups, appeared in the 5th decade.

MALIGNANT TUMOURS OF THE TESTIS

There were 45 cases of malignant tumours of the testis treated in the radiation therapy department. While a general analysis showed no significant features, a racial comparison proved interesting, and revealed features not previously recorded.

There were 37 cases in Europeans (average age 37) and only 8 cases in Africans (average age 32) (Tables I and II). Berman,[5] in his review of malignancy among African mine workers on the Witwatersrand, found only 1 malignant testis among 270 cancers diagnosed, and this was in patients averaging 30 years in age. Oettlé,[6] in a review of malignancies found in Johannesburg Africans over a 3-year period observed only 2 malignant testes, when from a similar White population he would have expected 22.

Further analysis of the 8 cases in Africans showed that there were only 3 cases of malignancy in scrotal testes, the remaining 5 occurring in ectopic or undescended testes; whereas in Europeans there were 3 cases in abnormally situated testes, the remaining 34 being in scrotal testes. It is generally

accepted that about 10% of malignant testes occur in undescended or ectopic testes, whereas undescended and ectopic testes occur in about 0·2% of the male population. These figures correspond reasonably well with our European figures, but are at variance with our Bantu figures. It would appear that in the African the normally situated testis is not as prone to malignant changes as in the European.

The pathological picture was roughly similar in the two races, with seminomas predominating. There were 24 seminomas, 19 malignant teratomas and adenocarcinomas, and 2 chorionepitheliomas. The serological tests for syphilis were all negative, and there were no histories suggesting syphilitic infections.

All the African cases were advanced, several with skin involvement and malignant inguinal glands, and all had palpable abdominal glands. One case appeared clinically clear at the end of 2 years, but it is presumed that the remainder died within 1 year of treatment.

Treatment. The majority of testicular tumours were dealt with by limited surgery, generally orchidectomy and removal of the cord up to the internal ring, as the primary treatment. In cases of embryonal growths this was followed by radiotherapy of moderate dosage to the operative site and regional lymph nodes. All seminomas, whatever the palpable extent of the disease, were subjected to extensive irradiation of the operative site, the inguinal and pelvic lymph nodes on the affected side, and the para-aortic lymphatics at least to the level of the diaphragm. Tumour doses of the order of 3,000 r were well tolerated. More extensive disease occasionally necessitated irradiation of the mediastinum and the supraclavicular fossa, and in a few very advanced cases, treatment of the whole trunk by the 'moving-strip' technique was applied. Treatment was still useful in the most advanced cases; even extensive lung secondaries could be controlled for long periods by intravenous nitrogen mustard followed by thoracic irradiation with small doses.

CANCER OF THE PENIS

In contrast to malignancy of the testis, cancer of the penis was found more frequently in the African. Out of a total of 47 cases treated during the 10-year period, 34 were Africans, and 13 Europeans (Table I).

The average age of the Europeans was 66 and that of the Africans 50 (Table II). In most of the regions previously analysed, malignancy tended to occur almost a decade earlier in the African, and the difference of 16 years is the highest so far noted.

Oettlé[6] in his 3-year analysis of cancer in Johannesburg Africans found 8 cases of penile cancer, when he would have expected 3·6 cases for a similar White population. He also found that penile cancer represented 1·74% of all male cancer in urban areas, and 1·9% of all male cancers in rural areas. Wainwright and Raach[7] found that among the Durban Zulus, who do not practice circumcision, penile cancer represented 5·8% of all male cancers.

Closer analysis of the 34 African cases revealed some unusual features. Nine had been previously treated for syphilis, and there were 2 proved cases of lymphogranulomatosis. Several other patients gave histories of previous venereal infections, and it can be assumed that about half the African cases had had previous venereal disease.

In 8 of the Bantu cases the skin of the prepuce was the site of the primary lesion, and in 4 others the skin of the shaft of the penis, one of the latter having 2 separate malignant ulcers, one on the prepuce and one on the shaft. Thus approximately one-third of the cases among Africans could be classed as skin cancers. It has been shown previously that skin cancer in the African is not commonly found on exposed parts, and is usually grafted on pre-existing lesions such as scars of burns, syphilitic scars, keloids and chronic ulcers.

Circumcision as practised by the African witch-doctor on adolescents does not seem to confer much immunity, for several cases had undergone this type of circumcision. It is well known that the ritual circumcision is incomplete by surgical standards, and often results in scarring.

Racial comparison of the relative frequencies of cancer of the testes and penis thus shows a complete reversal, and it is difficult to speculate on the reasons for this. The skin sensitization in previous lesions probably plays a part in a small percentage of cases, but cannot account for the general preponderance of cancer of the penis in Africans. The lack of hygiene and the constant presence of smegma in the unsophisticated African suggests a possible carcinogen, and this aspect of the problem should be investigated, particularly in view of the relative frequency of carcinoma of the cervix in the African female.

CANCER OF THE PROSTATE

Since treatment of this condition is predominantly surgical, very few patients were referred for irradiation, and these have not been included in this report. It is generally agreed, however, that prostatic cancer is more frequent in Europeans than in Africans.

TUMOURS OF THE KIDNEY

There was a total of 106 kidney tumours, 61 in Europeans and 45 in Africans (Table I), which does not suggest any remarkable difference in the incidence of this disease in the two racial groups. However, the relative frequency of adenocarcinoma and nephroblastoma is markedly different in the two races.

Adenocarcinoma

Adenocarcinoma of the kidney is far more frequent in Europeans than in Africans (Table I), and affects males in two-thirds of cases. The average age of patients with renal cancer (excluding the nephroblastomas of childhood) is 56·4 years in Europeans and 43·2 years (more than a decade younger) in Africans (Table II).

There were no significant differences in staging in the various groups, approximately two-thirds of all patients being classified as 'late' or 'advanced' cases, and one-third as technically operable lesions. The majority of patients in all groups, however, had undergone some surgical procedure, nephrectomy when feasible, before irradiation.

Radiotherapy was given with the object of eradicating any residual disease, and was designed to deliver 5,000 r or more to the tumour, or to the operative site. This was achieved most satisfactorily with two opposed fields, each 15 × 10 cm. in area, subdivided by means of a 50%-transmission lead-rubber grid. A few cases treated on the right side developed duodenal ulcers, presumably attributable to the radiation; the ulcers could be controlled by simple drugs and mixtures. Though no useful statistics are available, the immediate results of the radiotherapy appear to be satisfactory.

Nephroblastoma

Nephroblastoma (Wilms's tumour) is more frequent in Africans, in whom it constitutes 71% of all kidney tumours, compared with only 20% in Europeans (Table I). There also seems to be a slight female preponderance, 63% of nephroblastomas in African children being in girls. All but 2 of the 44 cases appeared in the first decade of life, most of the patients being under 4 years of age, and no obvious difference was noted in the age of onset in the two racial groups. There seems to be no apparent explanation for the greater susceptibility to this tumour on the part of infant African girls.

The management of nephroblastoma, it is generally agreed, consists of surgery with either pre- or post-operative irradiation. The majority of tumours in this series were so large as to be technically inoperable when first seen, and in this type of case pre-operative irradiation was the preferred approach. Treatment was directed to the whole abdomen through two opposed fields, usually antero-posterior, occasionally lateral, delivering a total up to 2,500 r in about 4 weeks. A lead shield centred posteriorly over the remaining normal kidney served to reduce the dosage in this organ to somewhat less than half the average tumour dose, thus obviating the risk of late renal fibrosis and uraemia.

The tumours almost invariably responded dramatically to this procedure, continuing to regress for a period of 2 months or more and usually becoming small or barely palpable. In some cases the tumour was observed to get larger again after this period, and for this reason nephrectomy is advised 6 - 8 weeks after completion of radiotherapy. At this stage the operation is technically feasible, a normal-sized or moderately enlarged kidney being readily removed *in toto*, together with adherent peritoneum. Evidence of residual malignancy is nearly always obtained on histological examination of the operative specimen. This finding proves that radiation is rarely able to eradicate the disease completely, and that surgical removal is an essential part of the treatment. A number of post-operative recurrences by transperitoneal implantation of tumour cells were still observed after the combined approach, and in recent years we have followed all these procedures with intraperitoneal instillation of a suitable radiocolloid preparation (P-32 zirconium phosphate is our current choice).

The end-results are usually satisfactory, though no firmly established statistics are available. One patient is known to have survived, and is apparently cured, over 5 years, after unequivocal radiological evidence of lung secondaries, which were treated by a second course of radiotherapy directed to both lung fields.

CANCER OF THE BLADDER

Among the 164 cases of bladder carcinoma there were only 24 Africans, suggesting a distinctly greater incidence in Europeans, though the possibility, which cannot be excluded, that a number of African cases were too advanced or otherwise unsuitable for treatment may have biased this ratio. Males are more commonly affected than females, 82% of all cases being in men. (Table I.)

Among the European cases the commonest histological diagnosis was the transitional-cell carcinoma, which accounted for 48% of all bladder tumours; next most frequent were the papillary carcinomas (37%), while squamous-cell cancer constituted only 15% of the series. By contrast, squamous-cell carcinoma is by far the commonest malignant bladder tumour in Africans, accounting for 63% of our series, and confirming the findings of Kisner and Fine[8] at the Baragwanath Hospital in 1958. (Table I.) These authors found that this predominant squamous lesion was most frequently associated with bilharzial infestation, which must be considered an aetiological factor in these cases.

The average age of the African cases (46 years) was nearly 2 decades younger than the European average (65 years) (Table II).

The *management* of these patients was complicated by the fact that less than one-quarter of bladder tumours referred could be classified as reasonably 'early' cases. Nevertheless, some 80% of patients received one or other 'radical' therapeutic procedure such as radium implant, cobalt-60 as a central source in a Foley-type catheter, or conventional high-voltage X-ray therapy. None of these conventional methods of treatment have given satisfactory results, at least in the advanced bladder cancers presented in this series. In a preliminary follow-up survey there have in fact been no 5-year survivals of patients treated before 1954. In recent years, however, distinctly better results have been obtained in a series of selected early cases treated by means of 'permanent implants' of the relatively long-lived tantalum-182 isotope. This method, which will be described elsewhere, permits delivery of very large tumour doses with negligible local reactions and uniformly satisfactory tumour regressions.

SUMMARY

The cases of tumour of the genito-urinary system referred to the Radiotherapy Department of the Johannesburg Hospital during the 10 years 1949 - 58 are classified and analysed. The following is a summary of the conclusions:

1. The most prevalent tumour in our whole series was found to be carcinoma of the cervix, which accounted for over one-third of all cancer in African women. An unusual feature was the little difference in the average age incidence between the two racial groups; all other malignant disease analysed was found to occur in the African a decade earlier than in the European.

2. Treatment of cancer of the cervix was generally by means of radium and X-rays. In advanced recurrent cases intra-arterial chemotherapy combined with irradiation has given most encouraging results.

3. In contrast to carcinoma of the cervix, cancers of the ovary and of the body of the uterus were found to be remarkably infrequent in the African female by comparison with European cases.

4. Tumours of the testis were found to be relatively rare in the African, and in more than half the cases the malignant changes occurred in undescended or ectopic testes. It would appear that in the African the normally situated testis is not as prone to cancer as in the European.

5. Cancer of the penis was found to be relatively more frequent in the African, and previous venereal disease seemed to be a predisposing factor. Several cases were atypical in that the skin of the prepuce and penis seemed to be the primary site of the malignant lesion.

6. It is suggested that the presence of smegma, due to lack

of hygiene, is a probable aetiological factor in penile cancer, and possibly also in carcinoma of the cervix. It would appear that in the South African Bantu, control of venereal disease, circumcision and better hygiene would considerably reduce the number of penile cancers, and might also diminish the incidence of cervical cancer.

7. Amongst renal tumours, it was found that in Africans nephroblastomas were significantly more frequent than adenocarcinomas. In Europeans the reverse obtained, adenocarcinoma being far more prevalent than nephroblastoma.

8. Malignant bladder tumours were far more frequent in Europeans than Africans, being predominantly of the papillary and transitional types; those that did occur in Africans were generally squamous-cell cancers and often associated with bilharzia.

We wish to acknowledge the help of Dr. K. F. T. Mills, Superintendent of the Johannesburg Hospital, in allowing us to use hospital records.

Part of the expenses incurred in the preparation of this paper were defrayed by the Farquhar Bequest Cancer Research Fund, to which due acknowledgement is made.

REFERENCES

1. Cohen, L., Shapiro, M. P., Keen, P. and Henning, A. J. H. (1952): S. Afr. Med. J., **26**, 932.
2. Shapiro, M. P., Keen, P., Cohen, L. and De Moor, N. G. (1955): *Ibid.*, **29**, 95.
3. Keen, P., Cohen, L., De Moor, N. G., Durbach, D. and Shapiro, M. P. (1957): *Ibid.*, **31**, 637.
4. Murphy, W. T., and Schmitz, A. (1956): Radiology, **67**, 37885.
5. Berman, C. (1935): S. Afr. J. Med. Sci. (1935): **1**, 12.
6. Oettlé, A. G.: Personal communication.
7. Wainwright, J. and Raach, G. G. (1957): S. Afr. Cancer Bull., **1**, 162.
8. Kisner, C. D. and Fine, H. (1958): Med. Proc., **4**, 294.

DIABETIC AMYOTROPHY

HYAM ISAACS, M.B., DIP. MED. (RAND), M.R.C.P.E., and GERALD GILCHRIST, M.B., B.CH. (RAND), *Johannesburg*

One half (50%) of patients suffering from diabetes mellitus have in association some form of neuropathy.[6] The neuropathies are for the most part quite independent of the hyperglycaemia, the two being separate manifestations of a generalized metabolic disorder.

CASE REPORTS

Case 1

Mrs. S.M.S., aged 59, stated that she had sat in a cold draught 2 weeks previously, following on which she developed severe pain in the right eye and drooping of the eyelid. The next day she complained of double vision. For the previous few months the patient thought that the toes of both feet were becoming rather stiff. She was known to have been hypertensive for some time. On direct questioning she admitted polydipsia and polyuria, which had been increasing in severity over that past 6 months. She went through the menopause at the age of 49 years. No family history of diabetes mellitus.

Examination. Pulse, temperature and respiration normal. BP 180/90 mm.Hg. Cardiovascular, respiratory, gastro-intestinal and genito-urinary systems normal. The fundal vessels showed slight arteriovenous nipping and silver wiring. The right eyelid was drooping and there was an oculomotor paralysis on that side. Other cranial nerves intact. Vibration sense absent up to the knees. All other modalities of sensation normal. Coordination and muscle tone normal. Muscle power extremely weak. Reflexes markedly depressed. Plantar respond normal.

Special investigations. Urine contained ++++ sugar; otherwise normal. Fasting blood sugar 360 mg. 100 ml. Glucose tolerance curve diabetic. WR negative. Total lipid 1,069 mg./100 ml. Serum cholesterol 318 mg./100 ml. No porphyrin or porphobilinogen in urine. Blood urea 33 mg./100 ml. Serum electrolytes normal. Fractional test meal showed free acid. Urinary estimations for 17-ketosteroids (determined as dihydro-androsterone) 6·6 mg., 17-ketogenic steroid 9·1 mg., and 17-hydroxycorticosteroid 6·1 mg. in 24 hours. Urine examinations for heavy metals negative. Stools negative for poliovirus. ECG normal. X-rays of the chest, skull and spine normal. CSF: pressure normal, protein content 119 mg./100 ml., otherwise normal; 2 weeks later the protein 93 mg./100 ml.

Progress. Soon after admission condition deteriorated. Muscle weakness increased so that movement against gravity was all that could be achieved. Generalized areflexia. Breathing became mainly abdominal, respiratory rate 35/min. At no time pyrexia. Incontinence of urine developed but lasted only 2 days. Patient gradually improved and after 2½ months discharged from hospital, diabetes well controlled on 50 units of lente insulin.

Two months later readmitted and with severe pain in neck and shoulders radiating down both arms. Obvious wasting of both deltoids, supraspinati and interossei. Muscle fibrillation present. Unable to lift arms above head. No objective sensory loss. The generalized areflexia had persisted. The oculomotor nerve palsy had recovered completely. CSF protein 171 mg./100 ml.; no cells. Repeat X-rays of cervical vertebrae normal. The hyperglycaemia was still well controlled on the same dose of insulin. Random blood-sugar levels all below 160 mg./100 ml. Physiotherapy was continued. The patient improved and was discharged after 3 weeks in hospital.

Over the next 8 months muscle power had improved considerably and full range of movement had returned to all limbs. The pain in the shoulders had subsided, and the reflexes were all present but weak. The patient then developed an abducent nerve palsy of the left eye, which recovered after 6 weeks without alteration in the treatment.

Case 2

A.K., African girl, aged 16 years, complained of severe generalized weakness for the past 8 months. The condition was progressive and she had been bedridden for the past 2 months. Two months before the weakness began she had experienced pain in both knees, which cleared up spontaneously after 6 weeks. On direct questioning she told of increased thirst and polyuria over the past 10 months. No history of febrile illness during this period. Never menstruated. No family history of diabetes.

Examination. Severe generalized weakness, being unable to lift arms or legs. Bilateral foot-drop and wrist-drop, and the small muscles of feet and hands grossly wasted. Tendon jerks not elicited. No fibrillation seen and no objective sensory disturbance found Fundi normal. The breasts well developed but the pubic and axillary hair scanty. Rest of examination negative.

Special investigations. Fasting blood sugar 249 mg./100 ml. Over 24-hour periods an average of 230 g. of sugar was lost in the urine. CSF: pressure 120 mm. H_2O, no cells, protein 132 mg./100 ml. Porphyrin excretion normal. Haemoglobin 15 g./100 ml. Leucocytes 6,500/c.mm., normal differential count. Serum mucoprotein 100 mg./100 ml. WR negative. Electrolytes normal. X-rays of chest, abdomen and spine normal.

Treatment and progress. Insulin was started and the diabetic state brought under control. Active physiotherapy commenced. After 2½ months the CSF protein had dropped to 42 mg./100 ml. Patient discharged after 7 months, able to walk with the aid of calipers. Foot-drop had persisted. Considerable strength had returned to the upper limbs and the hands were quite useful.

When seen 4 months later, wasting of the interossei and thenar and hypothenar muscles still evident. The reflexes had not returned. There was no obvious deterioration despite the fact that the patient had discontinued her insulin for the past 6 weeks and the diabetes was now completely out of control. CSF protein, however, had

risen to 120 mg./100 ml. Insulin was recommenced and 1 month later the level of the CSF protein had returned to normal.

Case 3

Mr. B.I., aged 65, complained of pain in the right hip and thigh for the past week. This was a recurrence of a similar episode lasting for 2 months 2 years before. The pain was severe and cutting in nature, worse at night. The leg had become weak and he could walk only with the aid of a stick. A known diabetic of many years' standing, well controlled by dieting.

Examination. Well nourished. Rather deaf. BP 120/75 mm. Hg. Bilateral cataracts obscured visualization of fundi. Heart, respiratory, gastro-intestinal and genito-urinary systems normal. Mild senile tremor obvious. Dorsalis pedi pulses absent. Varicose pigmentation evident on both ankles, with varicose veins of legs. Muscle tone normal, power good with exception of muscles of right thigh. No muscle fasciculation or fibrillation. Right knee jerk absent. All modalities of sensation intact.

Special investigations. Blood count normal, ESR normal. Serum potassium 4·4 mEq./litre; chloride 103; sodium 138; CO_2 26. Fasting blood sugar 141 mg./100 ml. Glucose tolerance curve diabetic. Urine examination normal. ECG showed an incomplete right bundle-branch block. X-rays of chest showed marked unfolding of the aorta, with normal-sized heart and clear lung fields. X-rays of lumbosacral spine and sacro-iliac joints normal.

Progress. Walking improved over the course of 3 weeks, the pain decreased, and the patient was discharged and maintained on active physiotherapy and a low-calorie diet. No insulin needed. No glycosuria, and blood-sugar estimations 2 hours after meals never exceeded 160 mg./100 ml.

Case 4

Mrs. R.P., aged 67, complained of severe pain in her left hip and thigh over the past 3 weeks. The pain was 'cramp-like' and worse at night. She had noticed weakness of the thigh for some time, which had become severe over the past 2 weeks, making walking impossible. She had experienced a similar attack of lesser severity 2 years previously, which improved spontaneously after a month. Known diabetic of many years standing, well controlled by dieting. Gall-bladder, appendix and thyroid removed 20 years previously. History of diabetes on the maternal side.

Examination. Well-nourished. BP 160/80 mm. Hg. Heart enlargement to 6th interspace in mid-clavicular line, predominantly left ventricular. Pansystolic blowing murmur of mitral incompetence at apex. Motor power was good with the exception of the left thigh, where wasting was obvious; 4 inches difference in girth between the two thighs 6 inches above the knee. No fibrillation of muscle. Left knee jerk diminished. Coordination normal. Loss of vibration sense up to the knees; otherwise all modalities of sensation normal.

Special investigations. ECG showed evidence of past posterior infarction. Urine: 12 polymorphonuclears and 4 erythrocytes per high-power field; moderate growth of coliform bacilli on culture; trace of albumin present, sugar absent. Fasting blood sugar 135 mg./100 ml., and glucose tolerance curve diabetic. Serum potassium 5·1 mEq./litre; sodium 140; chloride 108; CO_2 28·6. Blood urea 29 mg./100 ml. Haemoglobin 15·5 g./100 ml. Leucocytes 7,800 c.mm., normal differential count. ESR 36 mm. in 1 hour (Westergren). CSF: pressure 120 mm. H_2O, protein 54 mg./100 ml. Serum cholesterol 205 mg./100 ml. Serum PB iodine 6 μg./100 ml.

Progress. The patient was given intensive physiotherapy and after 3 weeks could walk with the aid of a stick. Marked improvement in power and freedom from pain. Insulin not required.

Case 5

Mrs. L.D., aged 85, a diabetic of many years' standing. Receiving 30 units of soluble insulin twice a day at the time of admission. She complained that for the past year she had been loosing the 'feeling' of both hands. For the past few months confined to bed and unable to stand or walk because of weakness of legs. Also complained of epigastric pain, which was relieved by alkaline mixtures. Frequent attacks of palpitation associated with sweating. Angina on effort troublesome over the last 5 years. A younger brother was diabetic.

Examination. Well nourished, moderate hirsuties. Mild confusion, which had been present for the past month. She would answer direct questions but it was difficult to hold her attention; she knew she was in hospital and who she was, but was poor on time and day; intellect moderately impaired, arithmetic and spelling poor; relatives had noticed a gradual deterioration over the past 6 months. Appetite moderate. Marked weakness of all muscles, with slight atrophy of pelvic and shoulder girdles. No muscle fibrillation observed. She was able to move her limbs against gravity but could not hold the weight of her body. No objective sensory disturbance. Coordination normal. Fundi obscured by cataracts; iridocyclitis in right eye. BP 110/60 mm. Hg. All pulses present and vessel walls not sclerotic. Heart enlarged; left ventricular impulse. Respiratory, gastro-intestinal and genito-urinary systems normal.

Special investigations. Haemoglobin 14·5 g./100 ml. Leucocytes 5,900 c. mm., differential count normal. Blood urea 52 mg./100 ml; serum potassium 5·0 mEq·0/litre; sodium 135; chloride 102; CO_2 25·7. Urine: +++ sugar and trace of protein; microscopy normal but on culture an abundant growth of bacillus proteus. CSF: pressure 150 mm. H_2O, 2 lymphocytes/c.mm. and 85 mg. protein/100 ml. The Lange colloidal gold yielded negative result. WR of blood and CSF negative. Fasting blood sugar 170 mg./100 ml. Serum PB iodine 5·1 μg./100 ml. Serum cholesterol 280 mg./100 ml. Except for a large left ventricle with unfolding of the aorta, X-ray of chest and spine showed nothing abnormal. ECG showed large left ventricle with ischaemic change.

Treatment and progress. Urine became sterile after a course of furadantin. The hypoglycaemic attacks stopped as the insulin was reduced. The iridocyclitis responded to hydrocortisone ointment, atropine drops and chloramphenicol. One month later the weakness was slightly improved, but the patient remained areflexic. The confusion had improved but intellectually she was unchanged.

Case 6

Mr. J.F.D., aged 66, was well until a year before admission, when he developed pain in his back associated with 'pins and needles' in both thighs going down to the toes. The back pain was severe and was later associated with pain in the left thigh, worse at night. At the time an orthopaedic surgeon, after X-ray, diagnosed osteo-arthritis and degeneration of disc and prescribed a corset for support. The pain persisted until admission a year later. No history of polyuria or polydipsia and no family history of diabetes.

Examination. BP 170/104 mm. Hg. Fundi showed arteriovenous nipping and berry aneurysms. Cardiovascular system otherwise normal. Respiratory, gastro-intestinal and genito-urinary systems normal. Both thigh muscles were a little wasted and power of movement about the hip and knee joints were reduced, most marked on the left side. All reflexes present and equal; coordination normal; no objective sensory disturbance.

Special investigations. Urine: + + sugar with trace of acetone; normal microscopically but moderate growth of *B. proteus* on culture. Blood urea 28 mg./100 ml.; plasma chloride 95 mEq./litre; CO_2 24·7; blood sugar 218 mg./100 ml.; serum amylase 13 Street-Close units. Haemoglobin 18·5 g./100 ml. Leucocytes 5,200/c.mm., neutrophils 82%. ESR 2 mm. per hour. CSF: pressure normal; 1 lymphocyte/c.mm. and protein 50 mg./100 ml. Total serum protein 8·5 g./100 ml; α 2 globulin 1·42 g./100 ml. Barium meal normal. On X-ray, chest normal, and lumbar spine showed a minor degree of osteophytic lipping, with marked narrowing between L5 and S1.

Treatment and progress. Tolbutamide, 1g. 6-hourly; 3 days later the blood sugar taken 2 hours after meals was 120 mg./100 ml., and simultaneously the pain disappeared and for the first time in a year the patient remained free of pain.

Case 7

Mrs. H.C.J., aged 81, mildly obese. For the previous 4 months she had complained of severe pain in the left thigh radiating down to the knee (and now in the back and the other thigh as well); the pain was present night and day, a little worse at night. Had lost about 10 lb. in weight and both legs had become extremely weak; so that she was unable to walk. She had a right mastectomy for cancer of the breast 15 years ago but had since been perfectly well. Six months before this admission she had been admitted to hospital (after a long period of polydipsia and polyuria) in a state of hyperglycaemic coma, with severe ketosis and blood sugar of 800 mg./100 ml., and was well controlled on 40 units of lente insulin a day; after discharge she failed to report back until her present complaint of pains in the thigh developed. After enduring the pain for 2 months she was admitted to another ward, where she received X-ray therapy to the lumbar spine, a diagnosis of secondary carcinomatosis having been made in view of the previous history.

As she did not respond to this treatment she went home, and was re-admitted 2 months later to us. There was then marked atrophy of the muscle about the pelvic girdle and she was unable to rise from the sitting position. Knee and ankle jerks absent on both sides. No objective sensory loss. She had only taken her insulin intermittently. The fundi were obscured by cataract. BP 165/110 mm. Hg. Rest of examination normal.

Special investigations. X-ray of lumbar spine showed marked osteophytic lipping with narrowing of the intervertebral space between L5 and S1. No X-ray evidence of metastatic tumour of the skeletal system. Urine: numerous polymorphonuclear cells and abundant growths of coliform bacilli on culture; trace of albumin; acetone and sugar present. Fasting blood sugar 274 mg./100 ml. Blood electrolytes normal. Full blood count and ESR normal. Serum alkaline and acid phosphate normal. Blood urea 47 mg./100 ml.; CSF: pressure 140 mm. H_2O; protein 130 mg./100 ml; sugar 142 mg./100 ml. WR negative. ECG normal.

Treatment and progress. The pyelonephritis responded well to antibiotic therapy and the fasting blood sugar fell to 144 mg./100 ml. The diabetes was controlled by diet and 1 g. of tolbutamide 6 hourly, the blood sugar 2 hours after meals being below 160 mg./100 ml. The pain responded dramatically. The patient was given intensive physiotherapy and was ambulant after 2 weeks.

Case 8

Mrs. S.L., aged 65, rather obese, presented with a complaint of severe pain in the legs and back for 18 months, shooting in character and followed by a feeling of numbness. Over the last few months the legs had become extremely weak and she was bedridden. The pains were often worse at night and she had noticed some oedema of the ankles for the past 6 months. A known diabetic for 17 years; had been controlled by diet only.

Examination. BP 170/68 mm. Hg. Vessels sclerotic, heart enlarged (mainly left ventricle), moderate degree of mitral incompetence. Cataracts had been extracted from both eyes. The right fundus showed evidence of optic atrophy with haemorrhages and marked narrowing of the arteries. The left showed numerous berry aneurysms and marked arterial narrowing. No hepatosplenomegaly or adenopathy. Generalized areflexia. Plantar responses flexor but at times equivocal. Muscle power very weak, especially in thighs and hands, where there was considerable atrophy. Occasional fibrillation in thighs. Facial musculature normal. No objective sensory disturbance.

Special investigations. Urine contained protein which varied between 1 and 11 g./litre, and trace of sugar. Full blood count and ESR normal. Fasting blood sugar 200 mg./100 ml. Plasma cholesterol 210 mg./100 ml. Serum electrolytes normal. Blood urea 48 mg./100 ml. Serum PB iodine 5·0 μg./100 ml. Flocculation tests, except cephalin-cholesterol, normal. 24-hour volume of urine 1460 ml., containing total creatinine 935 mg. of which 73 mg. was creatine. Serum albumin 2·58 g.%, α 1 globulin 0·45 g.%, α 2 globulin 0·95 g.%, β globulin 1·31 g.%, and γ globulin 1·31 g.%. X-rays of chest showed left ventricular enlargement, lung fields clear; of skull some calcification in carotid siphon and minimal hyperostosis cranii; of cervical and lumbar region normal. ECG showed some left axis deviation with flattened T waves in standard II and III and over V 4, 5, and 6. CSF: pressure 130 mg. H_2O, protein 27 mg./100 ml. WR negative.

Treatment and progress. Blood sugar failed to respond adequately to tolbutamide and diet; with 20 units of lente insulin a day together with tolbutamide the 2-hour postprandial specimen was well under 160 mg./100 ml., but pains and muscle weakness remained unchanged. After 2½ weeks intensive physiotherapy was started; improvement has been slow but definite, with considerable relief of pain and increased muscle power.

DISCUSSION

The frequency of neurological manifestations, which occur in some form or another in over 50% of diabetic subjects, does not seem to be related to the severity or duration of the hyperglycaemic state. If, however, we believe that the metabolic defect of diabetes mellitus is present from birth, becoming progressively more severe, or only becoming apparent late in life, then neurological complications are a comparatively late manifestation. Only one case of amyotrophy under the age of 30 years has been reported.[5] Case 2 is unusual in that neurological manifestations came on at a very early age. Nevertheless, the neurological manifestations may be the presenting feature which first draws attention to the diabetic state (cases 1 and 2).

The pure motor neurological complications that are seen from time to time have in the past received only brief attention. Rundles,[11] in a comprehensive survey, failed to mention this aspect. Jordan[7] and Woltman and Wilder[16] found that motor disturbances were rare and mostly associated with some sensory abnormality. Bruns[1] (1890), in elderly diabetics, described the association of muscle weakness with pain in the hip and thigh and without objective sensory loss. This syndrome was reintroduced into clinical medicine by Garland and Travener[3] (1953) as diabetic myelopathy. Garland[4] (1955) has described numerous cases and now groups them under diabetic amyotrophy. This terminology is satisfactory and is not meant to pin-point the lesion, which may vary from the muscle itself to the spinal cord, producing the picture of muscular weakness and wasting, which are constant findings in this condition. Cases 3, 4 and 6 are typical examples. In cases 1, 2, 5, 7 and 8, the motor involvement is symmetrical In cases 1, 2, 5 and 8 the condition is generalized as well as symmetrical and is accompanied by areflexia. Because of the absence of objective sensory disturbance, these cases cannot be classified as diabetic polyneuritis, of which only a few true examples have been described.[2,9,10,14] Occasionally in other syndromes involving the nerve roots rather than the peripheral nerve, as in infective or febrile polyneuritis or the Landry-Guillain-Barré syndrome, the sensory disturbance may be minimal, and the possibility of coincidental pathology in our cases was considered. The absence of pyrexial illness or any other known cause of polyradiculitis such as porphyria, heavy-metal poisoning, malnutrition, sarcoidosis, polyarteritis nodosa, scleroderma, or amyloid disease, together with the fact that most of these are characterized by both sensory and motor change, minimizes the possibility of double pathology. The presence of diabetes mellitus, the cyclical nature of the neurological manifestations in cases 1, 3 and 4, and the lowering of the CSF protein with insulin therapy in cases 1 and 2, makes the diabetic aetiology fairly certain.

Of the 8 cases recorded, 5 required insulin, 1 tolbutamide and 1 a combination of both. The neurological response in 3 of the 5 cases treated with insulin was not dramatic; cases 6 and 7, however, responded rapidly to lowering of the blood-sugar level. Cases were considered controlled when this level fell below 160 mg./100 ml. 2 hours after meals. In 6 cases no correlation between diabetic control and neurogical improvement could be demonstrated. The varying manifestations of case 1 recurred despite adequate control, and improved spontaneously. Cases 3 and 4 gave histories of spontaneous improvement on previous occasions, and case 11 seemed no worse off neurologically for her insulin having been stopped, although a rise in CSF protein occurred.

These therapeutic results are somewhat similar to those of Hirson *et al.*[6] who described, amongst other cases, 12 manifesting as weakness and wasting of the quadriceps femoris; foot drop was observed in 6 cases, being bilateral in 1; weakness and wasting of the hands were seen in 4; in 1 case only did the condition recover with hyperglycaemic control. These results are disappointing when compared to the dramatic improvement with insulin reported by Garland,[5] who has

pointed out that the hyperglycaemia may be intermittent, as in cases of rapid absorption following gastrectomy, and comments on the possibility that hypoglycaemia may be an aetiological agent in the production of amyotrophy. Amyotrophy in cases of pancreatic insulin-secreting adenomata have been recorded.[13,12,15] In our cases we consider that intermittent hypoglycaemia was a factor contributing to the mental deterioration in case 5. Muscle fibrillation was seen in cases 1 and 8, which also demonstrated the unusual features of atrophy and weakness affecting the upper limbs, in case 8 as much as, and in case 1 more than, the lower extremities. The CSF protein in cases with diabetic neurological manifestations may vary from normal to marked increase without increase in cells. High protein levels have been reported.[7,8,11]

It was most encouraging to see the excellent progress in the rehabilitation of these cases brought about by intensive physiotherapy directed by a persistent and interested physiotherapist.

Electromyographical studies in these cases of amyotrophy (Fig. 1) reveal a reduction in motor unit activity on maximum contraction. Fibrillation potentials may occur and the degree of synchronization recorded by different electrodes in the same muscle may be marked. The motor unit potentials may have an unusually high voltage, suggesting together with other features that the lesion in some cases may lie in the spinal cord or motor nerve root. In case 8 the muscle showed marked irritability and exhibited bursts of myotonic activity. This has been classified as pseudomyotonia (as may be seen in cases of polymyositis). The possibility of an unsuspected polymyositis in case 8 was ruled out by the muscle biopsy findings, which were typical of a lower motor-neurone lesion. The muscle histology in diabetic amyotrophy is consistent with the atrophy following on nerve degeneration; bundles of fibres may be atrophic, reduction and thinning of individual fibrils may be seen, and loss of myohaemoglobin and transverse striation may occur. The histological features of muscle atrophy of varying degree was present in all 8 cases.

The muscles mainly involved are the proximal ones, the pelvic girdle being almost invariably involved and less commonly the shoulder girdle. The muscles are involved in groups and do not tend to follow any neural pattern. In some cases distal muscles are involved as well, when there may be some similarity to the group of motor-neurone diseases. The weakness and wasting may be either mainly unilateral or symmetrical; so also may be the distribution of pain, which is almost invariably present and is not characteristically asymmetrical as has been stated.[3,4] Although amyotrophy is more commonly found in elderly mild diabetics, it is not confined to this group. Many cases are seen where severe weakness and muscle atrophy are associated with objective sensory disturbance, some showing more motor than sensory involvement and others *vice versa*. Other cases, though rare,

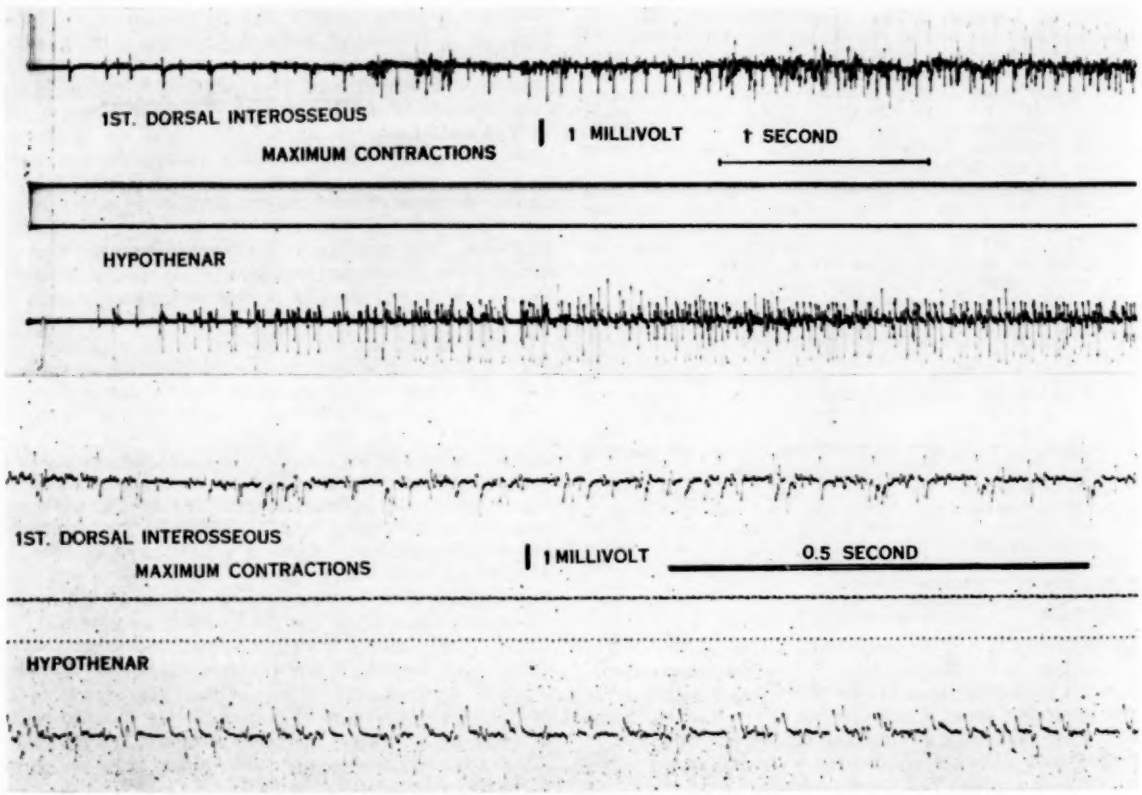

Fig. 1. Case 8. Electromyographic studies showing single motor unit potential and mixed patterns on maximum contraction.

may present with involvement of the sympathetic nervous system marked by severe postural hypotensions. Diabetes mellitus may then be associated with neurological manifestations which vary markedly from case to case. The decade now ended has rightly seen emphasis laid on the much neglected aspect of motor involvement, and the pattern can now fall into place leaving us with a clearer conception of the neurological manifestations of diabetes mellitus.

SUMMARY

Eight cases of diabetic amyotrophy are presented. Four cases are unusual in that they demonstrate severe generalized symmetrical motor weakness. Control of hyperglycaemia led to rapid relief of pain in 2 cases only. One case was of particular interest in that pseudomyotonia was demonstrated on electromyography.

We wish to thank Dr. A. L. Agranat, senior physician, Johannesburg General Hospital, Dr. E. N. Popper, physician to the Non-European Hospital, and Dr. K. F. Mills, medical superintendent of Johannesburg General Hospital, for their help and cooperation; and Mr. A. Shevitz and Mr. H. Kruger, of the photographic unit of the Department of Medicine of the University of Witwatersrand, for the photographs. The electromyograms were recorded by Dr. H. Isaacs in the EMG Department of the neurosurgical unit of the Princess Nursing Home. Mr. K. Lewer Allen in particular is thanked for his cooperation.

REFERENCES

1. Bruns, L. (1890): Berl. klin. Wschr., **27**, 509.
2. Buzzard, T. (1890): Brit. Med. J., **1**, 1419.
3. Garland, H. and Traverner, D. (1953): *Ibid.*, **1**, 1405.
4. Garland, H. (1955): *Ibid.*, **2**, 1287.
5. *Idem. In* Williams, D. (1957): *Modern Trends in Neurology*, p. 229. London: Butterworth.
6. Hirson, C., Feinmann, E. L. and Wade, H. J. (1953): Brit. Med. J., **1**, 1408.
7. Jordan, W. R. (1936): Arch. Intern. Med., **57**, 307.
8. Joslin, E. P. and Root, H. F. (1939): Trans. Assoc. Amer. Phycns., **54**, 251.
9. Pitres, A. and Marchand, L. (1917): Progr. méd. (Paris), **36**, 296.
10. Root, H. F. (1922): Med. Clin. N. Amer., **5**, 1433.
11. Rundles, R. W. (1945): Medicine, **24**, 111.
12. Silfverskiold, B. P. (1946): Acta med. scand., **125**, 502.
13. Tom, M. I. and Richardson, J. C. (1951): J Neuropath., **10**, 57.
14. Wedgewood, J. (1957): Brit. Med. J., **1**, 1346.
15. Williams, C. J., (1955): *Ibid.*, **1**, 707.
16. Woltman, H. W. and Wilder, R. M. (1929): Arch. Intern. Med., **44**, 576.

WEIGHT, HEIGHT AND SKINFOLD THICKNESS OF ZULU ADULTS IN DURBAN

C. SLOME, M.B., CH.B., D.P.H.; B. GAMPEL, M.B., B.CH., D.P.H.; J. H. ABRAMSON, B.Sc., M.B., B.CH.; and N. SCOTCH, PH.D.*

Department of Social, Preventive and Family Medicine, University of Natal, and Department of Sociology and Anthropology, State College of Washington, Pullman, Washington

Despite the value of weight and height norms in the assessment of the clinical state of individuals and groups, there is a paucity of such norms for African groups.

This report deals with observations of the weight, height, and skinfold thickness measurements, of Zulu adults (aged 20 years or more) residing in a housing scheme for Africans in Durban. These observations were made in the course of a broader nutrition-hypertension study project carried out in October-December 1958.

METHODS AND SUBJECTS

The subjects were weighed unclothed, by means of an Avery personal scale. Height was measured standing erect, with the line of sight horizontal.

The relative weight of each subject was assessed by expressing the actual weight as a percentage of the mean weight of a US adult of the corresponding sex, age, and height. A relative weight of 125% indicated that the person was 25% over-weight relative to this standard. The US standards used were derived from the US Medico-actuarial Mortality Investigation.[1] As our subjects were measured without clothes, the findings were first adjusted by adding 1 inch and 10 lb. for men, or 1½ inches and 6 lb. for women. Subjects aged over 55 years were compared with the standard provided for persons of 55.

Skinfold thickness measurements were made with the Harpenden skinfold caliper,[2-3] which exerts a constant pressure of 10 g. per sq. mm. of contact surface. Measurements were made halfway down the back of the right arm, over the triceps. The site was marked, a fold of skin and subcutaneous tissue lifted, and the caliper applied. Three measurements were made at each site by each of two clinicians, and further readings were taken if the values were not close. A mean was calculated on the basis of 3 consecutive close values recorded by each clinician. If there was much difference between observers, further observations were made.

The sample comprised the adult Zulu residents of a randomly selected 1-in-7 sample of the homes in the housing scheme. The population of this housing scheme is predominantly Zulu (72·5%). The men are mainly employed in unskilled, predominantly manual, occupations.[4] Approximately a fifth of the women are gainfully employed away from home, mainly in domestic service. The median income per caput is £2 6s. 0d. per month, and the median food expenditure per caput £1 5s. 0d. per month. The main cereal eaten is refined maize, which contributes slightly over 50% of the average caloric intake. The usual diet includes relatively small quantities of fruit, green or yellow vegetables, milk, meat and fish.[5] There is a high prevalence of malnutrition in the community, manifested in a variety of skin and mucosal lesions.[6]

Of the persons in the sample, 63·7% were examined, comprising 76·6% of the women and 45·2% of the men. In view of the high failure rate among the men, it was not

* Work done during the tenure of a Research Fellowship of the US Public Health Service (under the sponsorship of Jeremiah Stamler, M.D., formerly Assistant Director of the Cardiovascular Department of the Medical Research Institute [Louis M. Katz, M.D., Director], Michael Reese Hospital, now Director, Heart Disease Control Program, Chicago Board of Health [Herman N. Bundeson, M.D., President]). This work was supported in part by a supplementary grant (H4197-S1) from the National Heart Institute of the US Public Health Service. It is a pleasure to acknowledge the guidance and support of Prof. M. J. Herskovits, chairman, and the Program of African Studies, Northwestern University. The financial assistance of the State College of Washington is also appreciated.

certain that the male sample, in particular, was a representative one. Accordingly, information was obtained about the marital state, income, food expenditure, social class, rurality and education of the non-examined persons of the sample, for comparison with the corresponding characteristics of the persons who had been examined. This comparison indicated significant differences only in respect of social class and education. Among the men examined, persons in the lowest social class (V) and persons with 4 or more years of schooling were significantly under-represented, while among the women examined, those in the upper social classes (I, II and III) were significantly under-represented. Examination of the weight, height and skinfold data in relation to social class and education indicated, however, that these selective factors did not affect the findings. Among the women examined, for example, there were no significant differences between the measurements of those in social classes I, II and III, and those in social classes IV and V. It seems reasonable to conclude, therefore, that the data which follow are applicable to the Zulu population of this housing scheme as a whole.

FINDINGS

Weight and Height

The data are summarized in Tables I, II and III.

TABLE I. WEIGHT AND HEIGHT. MEAN VALUES AND QUARTILE DISTRIBUTION

	Men	*Women*
No. in group	106	219
Height (inches)		
Mean	65·4	61·4
S.D.	2·4	2·3
25th percentile	64·1	60·1
50th percentile (median) ..	65·4	61·4
75th percentile	67·1	62·8
Weight (lb.)		
Mean	147·2	155·7
S.D.	27·9	33·7
25th percentile	124·5	131·0
50th percentile (median) ..	137·3	152·1
75th percentile	154·4	176·8

TABLE II. WEIGHT AND HEIGHT, BY AGE AND SEX

Age (*yrs.*)	*No. in group*	*Weight* (*lb.*)			*Height* (*ins.*)		
		Mean	*S.D.*	*Median*	*Mean*	*S.D.*	*Median*
Men							
20 - 29	33	135·1	12·0	136·7	65·3	1·9	65·7
30 - 39	32	144·5	20·9	145·8	65·8	2·1	65·5
40 - 49	20	142·5	28·7	136·9	64·9	3·5	64·8
50+	21	153·4	40·9	134·9	65·8	1·9	65·5
Women							
20 - 29	69	145·1	27·4	138·0	61·6	2·2	61·0
30 - 39	67	151·0	29·4	146·2	62·3	2·0	62·1
40 - 49	44	174·5	36·6	166·2	61·3	2·4	61·3
50+	39	161·2	37·1	159·9	61·1	2·4	61·0

TABLE III. WEIGHT/HEIGHT RELATIONSHIP

Height (*ins.*)	*No. in Group*	*Mean Weight* (*lb.*)	*S.D.*
Men			
62 - 63·9	15	136·5	—
64 - 65·9	41	140·7	16·5
66 - 67·9	29	146·0	29·6
Women			
58 - 59·9	30	150·5	35·1
60 - 61·9	81	154·2	29·3
62 - 63·9	58	160·1	34·7
64 - 65·9	22	170·2	27·5

The findings relate to 106 men aged 20 - 81 years, not suffering from major illnesses (tuberculosis, congestive cardiac failure, diabetes and hemiplegia), and 219 women aged 20 - 86 years, not pregnant or suffering from major diseases.

It is apparent from Table I that the women are decidedly heavier, though shorter, than the men. As Table II indicates, this tendency for the women to be relatively heavy is found at all ages, but particularly after the age of 40 years. The weight preponderance of the women is apparent when persons of the same height are compared (Table III).

As in other communities, there is a tendency, more clearly shown in the women, toward relative lightness among persons aged 50 and over (Table II). There is no evidence of a change in height with advancing years.

As expected, the mean weight rises with height in both sexes (Table III).

The relative weights of the persons studied, in comparison with a US standard, are presented in Table IV. It is apparent

TABLE IV. RELATIVE WEIGHT (IN RELATION TO US STANDARD)

Weight, expressed as percentage of US standard weight	*Men (No: 106)*		*Women (No: 219)*	
	No.	*%*	*No.*	*%*
Under 90%	23	21·7	13	5·9
90 - 109%	57	53·8	55	25·1
110 - 124%	20	18·9	68	31·0
125% or more	6	5·7	83	37·9

that a high proportion of the women are over-weight, 68·9% having weights which exceed the standard by 10% or more. The corresponding figure found in a US study[7] was 30·3% (based on 10,000 unselected life-insurance examinees, standardized for age and sex according to the population of the US). Over a third of the Zulu women are over-weight by 25% or more. Only 5·9% of the Zulu women are under-weight by 10% or more, compared with the US figure of 15·3%. The Zulu men, on the other hand, have a similar prevalence of over-weight to US men (24·6% and 25·7% respectively), but a higher prevalence of under-weight (21·7% and 10·2%).

As these differences may be partly due to ethnic factors, a comparison was made with figures available for other African groups (Table V). This indicated that the men studied

TABLE V. MEAN WEIGHT FOR HEIGHT, COMPARED WITH AVAILABLE AFRICAN STANDARDS (PERSONS AGED 20 YEARS OR OVER)

Height (*ins.*)	*Mean weight* (*lb.*)		
	Durban Zulu	*Rural Zulu*[8] *	*Uganda*[9] †
Men			
62 - 63·9	136·5	122·5	113·3
64 - 65·9	140·7	131·1	121·8
66 - 67·9	146·0	138·3	130·5
Women			
58 - 59·9	150·5	114·0	—
60 - 61·9	154·2	121·1	—
62 - 63·9	160·1	128·9	—
64 - 65·9	170·2	137·0	—

* The mean weights given are those of men whose height is 63 ins., 65 ins., and 67 ins. respectively, and women whose height is 59 ins., 61 ins., 63 ins., and 65 ins. respectively.

† The mean weights given are those of men whose height is 63 ins., 65 ins., and 67 ins. respectively.

are somewhat heavier, at all heights, than rural Zulu men[8] and Uganda men of varied ethnic origins.[9] The Durban Zulu women are considerably heavier, by over 30 lb., than rural Zulu women of the same height.[8]

Weight-age curves of the Durban adults studied, and of rural Zulu and Canadian adults[10] are shown in Fig. 1. In

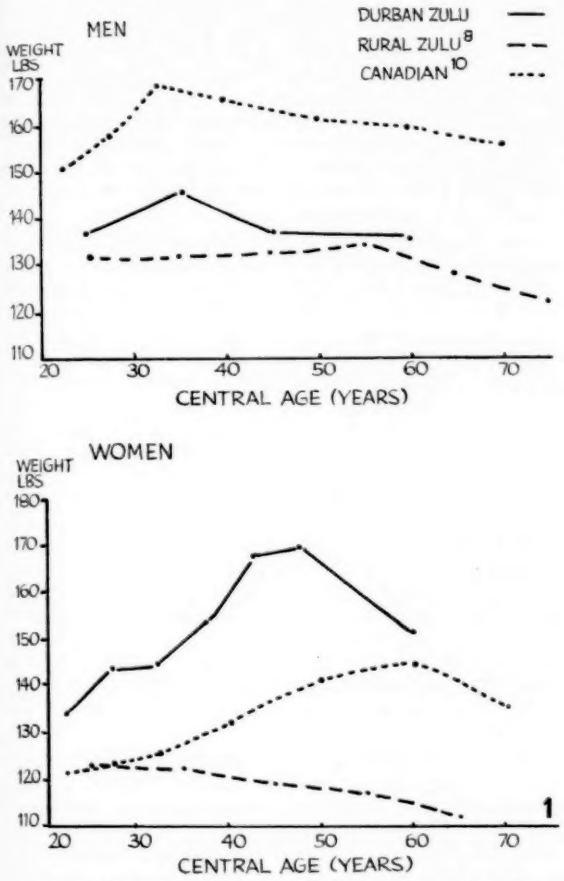

Fig. 1. Weight-age curves. The Durban Zulu and Canadian figures represent median values. The top age-group in each instance is as follows: Durban Zulu, 50 years or over (men) 55 years or over (women). Rural Zulu, 70 years or over (men), 60 years or over (women). Canadian, 65 years or over.

the Durban and Canadian groups, but not in the rural Zulu group, there is a tendency for persons in early or late middle age to be heavier than younger adults. Among the Durban men, the weight peak occurs at about the same age as among the Canadian men. Among the Durban women, it occurs earlier than among Canadian women.

Comparative data on the heights of our subjects and other Zulu groups[8,11] are presented in Table VI. While there is no appreciable difference, in either sex, from rural Zulus studied in 1940 - 45, the heights of the Durban men are significantly lower than those of rural Zulus studied in 1927 ($P<0{\cdot}001$). The number of Zulu women studied in 1927 is too small to merit a similar comparison.

TABLE VI. MEAN HEIGHT: COMPARISON WITH OTHER ZULU GROUPS (PERSONS AGED 20 YEARS OR OVER)

Place and Date	*Men*				*Women*		
	No.	*Median age (yrs.)*	*Height (ins.)*		*No.*	*Median age (yrs.)*	*Mean height (ins.)*
			Mean	*S.D.*			
Durban 1958 ..	106	36·8	65·4	2·4	219	35·1	61·4
Pholela* 1940 - 5	696	39·0	65·5	—	1,846	32·3	61·6
Eshowe[11] 1927 ..	30	34·5	67·1	2·3	12	25·0	61·9

* Figures derived from Kark.[8]

Arm Skinfold Thickness

The mean skinfold thickness measurements are presented in Table VII, and the distribution of measurements in Table VIII.

TABLE VII. ARM SKINFOLD THICKNESS (MM.) BY AGE AND SEX

Age (yrs.)	*Men*			*Women*		
	No.	*Mean*	*S.D.*	*No.*	*Mean*	*S.D.*
20 or over* ..	106	9·39	5·60	219	21·56	8·88
20 - 29 ..	33	8·56	3·43	69	20·32	8·94
30 - 39 ..	32	8·38	1·42	67	21·08	8·50
40 - 49 ..	20	9·00	5·61	44	24·90	7·50
50 + ..	21	11·55	8·50	39	22·12	9·36

*Combined.

TABLE VIII. ARM SKINFOLD MEASUREMENTS: DISTRIBUTION

Interval (mm.)	*Men (No: 106)*			*Women (No: 219)*		
	Frequency	*Cumulative frequency*		*Frequency*	*Cumulative frequency*	
		No.	*%*		*No.*	*%*
0 - 4·9	10	10	9·4	0	0	0
5 - 9·9	69	79	74·5	15	15	6·8
10 - 14·9	14	93	87·7	40	55	25·1
15 - 19·9	8	101	95·3	50	105	47·9
20 - 24·9	3	104	98·1	38	143	65·3
25 - 29·9	1	105	99·1	31	174	79·5
30 - 34·9	0	105	99·1	25	199	90·9
35 - 39·9	0	105	99·1	18	217	99·1
40 - 44·9	1	106	100·0	1	218	99·5
45 - 49·9	0	106	100·0	1	219	100·0

The values for the women are considerably higher than those for the men. Under 5% of the men have measurements of 20 mm. or more, compared with 52% of the women.

Comparative data for other groups[10,12,13] are presented in Tables IX and X. The Durban women tend to have higher values than Whites in Cape Town, Minnesota, or Sardinia, and slightly higher levels than Canadian men. The Durban

TABLE IX. ARM SKINFOLD THICKNESS: PERCENTAGE OF MEN WITH MEASUREMENTS OF 9 MM. OR LESS, COMPARED WITH OTHER GROUPS

Group	*Age (yrs.)*	*No. in group*	*Percentage with skinfold thickness of 9 mm. or less*	*P (compared with the Durban group)*
Durban Zulu	20 or over	106	72·6	—
African agricultural workers in S.A.[13] ..	20 or over	118	100	<0·001
Cape Town African[12] ..	40 - 55	113	60	<0·10
Cape Town Coloured[12]	40 - 55	93	56	<0·05
Sardinian police[12] ..	30 - 60	97	51	<0·01
Minnesota fireman[12] ..	25 - 63	238	20	<0·001
Cape Town White[12] ..	40 - 55	67	19	<0·001

TABLE X. ARM SKINFOLD THICKNESS: MEAN VALUE, BY AGE AND SEX, COMPARED WITH OTHER GROUPS

Durban Zulu		*African agr. workers in South Africa**		*Canadian*[10]	
Age (yrs.)	*Mean arm skinfold (mm.)*	*Age (yrs.)*	*Mean arm skinfold (mm.)*	*Age (yrs.)*	*Mean arm skinfold (mm.)*
Men					
20 - 29	8·56	20 -29	5·52	20 - 24	6·3
30 - 39	8·38	30 - 39	4·72	25 - 29	7·0
40 - 49	9·00	40 or over	4·78	30 - 34	8·2
50 or over	11·55			35 - 44	7·7
				45 - 54	7·5
				55 - 64	6·9
				65 or over	5·6
Women					
20 - 29	20·32			20 - 24	12·4
30 - 39	21·08			25 - 29	13·0
40 - 49	24·90			30 - 34	14·3
50 or over	22·12			35 - 44	15·5
				45 - 54	17·7
				55 - 64	17·7
				65 or over	15·5

* Derived from a study by Abramson, Slome and Ward.[13]

men tend to have lower values than Cape Town Africans and Coloured men; it is possible, however, that this difference is partly due to the fact that the Cape Town data refer to men aged 40 - 55 only. The Durban men tend to have higher values than a group of African agricultural workers in South Africa. Though these latter workers were of varied ethnic origins (mainly Pondo and Zulu), they exhibited no ethnic variation in skinfold thickness. It is noteworthy that the weights of 75% of these agricultural workers (compared with 52·8% of the Durban men) fell below the US standard for their height and age.

There was a high correlation, in the persons studied, between relative weight and skinfold thickness ($P<0·001$). As it is accepted that skinfold measurements provide a good estimate of the quantity of fat in the body,[14] it can be concluded that the differences in the weights of the men and women largely reflect differences in their adiposity.

DISCUSSION

For practical purposes it can be accepted that, although many factors may influence caloric intake and utilization, in general 'obesity results only from eating more than is required to meet the energy requirements of the body'.[15] It is likely that the considerably greater adiposity of the women is largely a reflection of sex variation in diet and physical activity.

The differences found from rural Zulu adults indicate that ethnic factors alone do not account for our findings. It is not unlikely that non-ethnic factors may play an important role in explaining the differences from non-African groups, viz. the lesser adiposity of the Durban men, and the greater adiposity of the women, particularly in early middle age.

The higher weights and skinfold thicknesses of the Durban subjects, by comparison with rural Zulu adults and African agricultural workers, indicate the probable importance of the role played by the urban environment. It is noteworthy that in this housing scheme, schoolgirls have been shown to be taller and heavier than rural Zulu girls.[16] It appears likely that urban life is characterized by a greater caloric intake than rural life, in relation to the level of physical exertion. For women in particular, town life means relative freedom from the strenous agricultural and other duties which characterize the life of the rural Zulu woman.[8]

In order to clarify the possible role played by the urban environment a comparison was undertaken of the measurements of persons, within the sample studied, who had spent most of their lives in rural or urban areas respectively. The data for persons who had been born in a rural area, and had spent 80% or more of their lives in such an area, were compared with those who had been born in an urban area, and had spent over 80% of their lives in an urban area. The numbers of persons for whom data were available enabled such a comparison to be made only among the women aged 20 - 34, among whom there were 38 'predominantly rural' and 24 'predominantly urban'. This comparison revealed no appreciable differences between the two groups, in respect of crude weight, relative weight, or skinfold thickness.

This surprising finding raises two possibilities. First, it is possible that the effect of the urban environment is one which can be rapidly produced, so that a relatively short time in town may be associated with a considerable increase in adiposity. The median time spent in town by the 38 'predominantly rural' women was 2·4 years. In addition, it is not impossible that there may be a selective factor in townward migration. There may be a tendency, somewhat analogous to that of relatively tall Aberdeen women to marry into a high social class,[17,18] for relatively stout Zulu women to move into an urban area, particularly into a neighbourhood such as the one studied, which is characterized by relatively stable family living.

The shortness of the men, compared with Zulu men studied 31 years previously,[11] is of considerable interest. It has been stated that 'a number of older (Zulu) men consider that the young adult of today is shorter than those of years ago'.[8] Our findings lend some substantiation to this belief. If the modern Zulu adult is in fact shorter than the Zulu adult of a generation ago, this may well indicate a deterioration, in the early part of this century, in nutrition during prenatal life and childhood.

The high relative weights and high skinfold thicknesses of the women should not be construed as evidence of good health. Not only are the hazards of obesity well recognized, but it is known that a higher weight is not necessarily associated with a low prevalence of skin and mucosal signs of malnutrition;[19] it has in fact been found, in a group of Africans moving into a changed environment, that an increase in adiposity may be accompanied by an increase in a variety of mucocutaneous signs of malnutrition.[18] There is a high prevalence of such signs of malnutrition among both sexes in this community.[6]

The weight, height and skinfold norms presented can in no sense be regarded as representing 'healthy' or 'optimal' values.

SUMMARY

A study was carried out, in October-December 1958, of the weight, height and arm skinfold thickness of a population sample of Zulu adults in Durban.

Data are presented in respect of these measurements, according to age and sex, and in respect of weight for height. These findings are compared with data for other groups.

The women were considerably more adipose than the men, as reflected both in their relative weights and in their skinfold

thickness measurements. A high proportion of the women were over-weight, by comparison with US women, and their skinfold measurements were higher than those of Canadian women. The men were under-weight and lean by comparison with most White groups. The large sex difference is ascribed to sex variation in diet and physical activity.

Both men and women tended to be heavier than rural Zulus. This difference is ascribed partly to the effect of the urban environment, and partly to a possible selective factor in townward migration.

There is evidence suggesting that the modern Zulu adult is shorter than the Zulu of a generation previously. This difference, if real, may indicate a deterioration, in the first part of this century, in nutrition during prenatal life and childhood.

We are indebted to our subjects, and to Nursing Sisters C. C. Majola and T. Triegaardt, Medical Recorders W. H. Pietersen and S. J. Maharaj, and other members of the staff of the Institute of Family and Community Health, Durban, as well as to Mr. N. Mdlazi, for their assistance in the study, and to Mrs. K. Wolfson for the chart.

REFERENCES

1. Association of Life Insurance Directors and Actuarial Society of America (1912): *Medico-actuarial Mortality Investigation*, vol. 1. New York. Quoted by Duncan, G. G. (1952): *Diseases of Metabolism*, 3rd ed. Philadelphia and London: W. B. Saunders Co.
2. Tanner, J. M. and Whitehouse, R. H. (1955): Amer. J. Phys. Anthrop., **13**, 743.
3. Edwards, D. A. W., Hammond, W. H., Healy, M. J. R., Tanner, J. M. and Whitehouse, R. H. (1955): Brit. J. Nutr., **9**, 133.
4. Kark, S. L. (1957): S. Afr. J. Lab. Clin. Med., **3**, 101.
5. Kark, S. L. and Chesler, J. (1950): Unpublished dietary study of an urban African community.
6. Abramson, J. H., Gampel, B., Slome, C. and Scotch, N.: Amer. J. Clin. Nutr., in press.
7. Editorial (1941): Proc. Life Ext. Exam., **3**, 99. Quoted by Rynearson, E. H. and Gastineau, C. F., *op. cit.*[15]
8. Kark, S. L. (1954): *Patterns of Health and Nutrition in South African Bantu*. M.D. thesis, University of Witwatersrand.
9. Coles, R. M. (1957): E. Afr. Med. J., **34**, 619.
10. Pett, L. B. and Ogilvie, G. F. (1956): The Canadian Weight-Height Survey, *in* Brozek, J., *op. cit.*[12]
11. Cipriani, L. (1930): Arch. antrop., **60**, 136.
12. Brozek, J. (1956): *Body Measurements and Human Nutrition*. Detroit: Wayne University Press.
13. Abramson, J. H., Slome, C. and Ward, N. T.: Amer. J. Clin. Nutr., in press.
14. Brozek, J. and Keys, A. (1956): Nutr. Rev., **14**, 289.
15. Rynearson, E. H. and Gastineau, C. F. (1949): *Obesity*, Springfield: Charles C. Thomas.
16. Kark, E. (1953): S. Afr. J. Med. Sci., **18**, 109.
17. Illsley, R. (1955): Brit. Med. J., **2**, 1520.
18. Baird, D. and Illsley, R. (1953): Proc. Roy. Soc. Med., **46**, 53.
19. Sinclair, H. M. (1948): Brit. J. Nutr., **2**, 161.

WHITHER TUBERCULOSIS?*

D. P. MARAIS, M.D., F.R.C.P. (EDIN.), *Cape Town*

I must crave the indulgence of my audience if I commence on a personal and reminiscent note since my interest in tuberculosis stretches over rather more than half a century—56 years, to be exact.

My association with Dr. R. W. Philip (later Sir Robert Philip), begun in my student days, became much closer after my graduation, when I worked with him and received an inspiration from him which has never flagged. Philip was a most remarkable man, with scientific, clinical, administrative and prophetic gifts far above his fellows. He became an international figure, and the first professor of tuberculosis at the University of Edinburgh. Somewhat belatedly his own country acknowledged his eminence and rewarded him with a knighthood. Looking back today on his achievements one is amazed at the depth and greatness of his foresight in the light of the complete fulfilment of so many of his prophetic pronouncements. His great part has been to design the scheme of control for tuberculosis, and with such insight and clarity that it remains today for universal adoption the most logical and effective method. My personal association with Philip in those days, and constantly since, until his death in 1938, has given direction to my life work. Thus I was soon drawn into tuberculosis work on my return to South Africa. I am very thankful to have been able for half a century to watch the successful direction of Philip's control scheme as reflected in many countries: and now in the penultimate stage with the application of chemotherapy I should be very happy if I could convey to my colleagues a vision of the future with a fraction of the assurance and clarity of my old master.

Mortality Rates

Much can be learnt from a study of the national tuberculosis mortality rates of countries possessing an organized statistical service. Thus the effects of war are clearly shown in the increased death rate from tuberculosis. Over a long period of years since 1860 the general death rates and also those from tuberculosis have slowly decreased—owing at first to general improvement in sanitation. The tubercle bacillus was discovered by Koch in 1882, and since the 1890s in Great Britain, and 1900 in the USA, there has been a steady acceleration of the rate of fall of the death rate from tuberculosis, out of proportion to the fall of the death rate from all causes.

This decline of tuberculosis, which is reflected in the mortality returns of most countries, shows the effect of three events in the history of tuberculosis, viz.: (1) The discovery of the tubercle bacillus by Robert Koch in 1882, (2) the operation of the coordinated control plan as first laid down by Philip, who opened the first 'dispensary' in Edinburgh in 1887 and worked out his universally adopted scheme in the 1890s; and (3) the introduction of chemotherapy about 1948.

The quinquennial death rate from tuberculosis per 100,000 of the population (all races) during the years 1895—1958 in the municipal area of Cape Town is an illustration of the decline of tuberculosis in a local area (Fig. 1). The establishment of clinics in 1910 and the introduction of chemotherapy in ± 1948 both led to a sharp fall in the death rate from tuberculosis. The rise in the rate after 1920 was due to the incorporation of Wynberg and other areas into the metropolitan area, and the lack of housing after

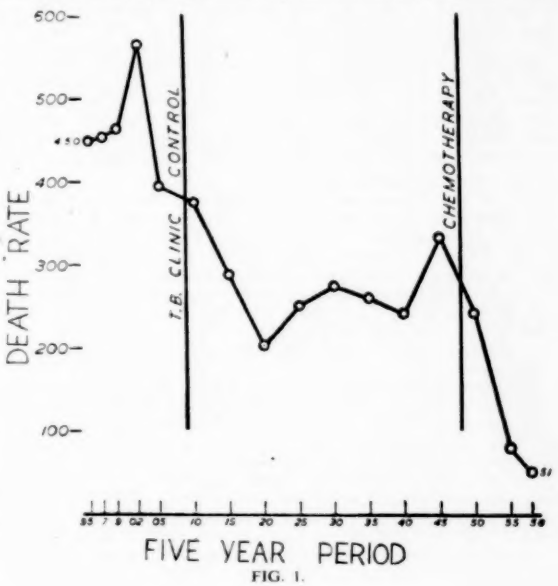

FIG. 1.

*Louis Leipoldt Memorial Lecture, Cape Western Branch (M.A.S.A.), Cape Town, 16 October 1959 (abridged).

World War I; and the rise after 1939 was due to the incorporation of a large area of the Cape Flats and to increased industrialization which, together with World War II, caused a shortage in housing and the creation of new slum areas.

CONTROL OF TUBERCULOSIS

Today we know with some certainty the conditions which encourage the onset and spread of tuberculosis, and we know also that by opposing those conditions we can limit both onset and spread.

The fundamental elements which underlie our ideas of tuberculosis control must first be considered in any organized scheme. To these we can now add a highly coordinated scheme with BCG, lung surgery, mass radiography and chemotherapy in support. Having done our best to correct environment, faulty habits, and dietetic deficiencies we can also, by BCG vaccination, build up in susceptibles some grade of natural resistance against the germ's attack. Granted that this resistance is not absolute, that it is temporary and evanescent, nevertheless in the Scandinavian countries and elsewhere BCG vaccination seems to show good results. Yet there remain the problems posed by drug-resistant bacilli and the creation of chronic cases. If, however, in 1924 it was clearly shown that it was within man's capacity to lower the death rate from tuberculosis significantly with the only means then available—general control, segregation and rest—it must surely be within his capabilities now, when earlier diagnosis are available to masses of the population, and with all the accessories (BCG, chemotherapy and surgery) at hand, to make a still greater impression on the downward plunge of the death rate. So now today I think I may say that we are several steps nearer the complete control and perhaps elimination of tuberculosis with a certainty never before possible.

It is not my intention to discuss here the technical difficulties of treatment, such as the knowledgeable application of the antibiotics, and the appropriate time for applying surgery. Such matters require the highest knowledge and experience in these routines: and for this reason the treatment of tuberculosis (pulmonary, especially) must be left to those trained and skilled in these matters. Disasters and chronic cases arise, in the majority of instances, from delayed diagnosis, and from unskilled application of treatment. I shall therefore follow the broad lines of the application of control, and leave aside all technical considerations. For, after all, the most important factor remains in really early diagnosis, and immediate and adequate treatment.

In dealing with tuberculosis, with its silent and subtle onset, the matter is much more complicated. Nevertheless our fundamental methods can be summed up very aptly by three slogans: (1) 'Every case comes from another.'; (2) 'Early discovery means early recovery'; and, if we add a third in its original idiom, (3) *Jedermann hat am ende ein bischen tuberculose*, we identify the factor of resistance which man has painfully acquired over the many centuries of his fight against the disease, but for which his suffering must have been greater, and his hope of recovery smaller. Here then are the basic elements of our scheme of attack, viz., early detection, almost synonymous with rapid recovery, infection controlled by segregation, and the development of the natural resistance by all means possible in the course of the fight.

Principles of Control Scheme

So far we have considered the problem in the light of the experiences of the older countries. We can learn much from these well-tried methods, and with suitable modifications they may well be applied under our local conditions. Modifications will naturally be necessary in our form of application, but the sound and logical methods of Philip's Edinburgh scheme remain as the substance of our control scheme. Briefly then the measures we must take are as follows:

1. Discover by all means available, and notify, every case of tuberculosis.
2. Isolate, control, and treat promptly every 'open' case.
3. Treat and control every case until arrested and safe.
4. Search for and examine all immediate contacts of cases discovered. It is most important to search the environment of the case; to wait for cases to apply for examination is to wait too long.
5. Correct the environment and the social factors which generate and permit tuberculosis to remain.
6. Watch especially the child contacts who may harbour the bacilli. Correct their environmental and nutritional faults so as to build up some grade of physiological resistance, which may later prevent the development of clinical tuberculosis.
7. Eliminate faulty conditions of housing and nutrition, the former by legislation, the latter by teaching and example, having special regard to workers in our new industries who have recently become urbanized.
8. Safeguard wherever possible all workers against strain, especially in hazardous conditions of work. The magnificent work of the Silicosis Bureau of our gold mining industry has become a pattern for emulation by all countries with a similar problem.
9. Protect by BCG vaccination all tuberculin-negative contacts of active cases, and especially those more than usually exposed to the risk of infection—medical students, doctors and nurses.
10. Rehabilitate into gainful occupation all disabled cases.

Such are already the broad lines on which our SANTA, our tuberculosis care committees and our National Christmas Stamp Fund for child contacts work. We have all the machinery for carrying this out in our State Health Department together with our voluntary associations.

Facilities Available

How is this working out? The cost of tuberculosis control for the Union in the last financial year was rather more than £5 millions. The departmental estimate of effective control is placed at £5 millions *per annum* with an annual increase of about £1 million. Great progress in the discovery of new cases is reported; thus, 5 years ago notification had uncovered 45,000 cases in the Union, and then only 6,200 hospital beds were available. Today at least 70,000 cases are known, and we have under control 20,000 in beds provided by the Department and by local authorities, SANTA and various missions, and many more as out-patients at 'clinics'. There are 18 mobile X-ray units in the Health Department, and 228 approved points for diagnostic radiography. The role of SANTA has become increasingly important since its inception in 1948, and especially since its national appeal for funds in 1952, when £700,000 was raised, and a very vigorous programme was instituted.

In 7 years SANTA has increased its bed establishment from 422 to 5,440 (in 28 centres). These beds are of a much less expensive type than hospitals can provide, and cost about £150—£170 each to establish and equip. SANTA 'centres' accomplish a new and important role; they receive cases for treatment, as soon as possible after notification, and sort them out according to the type of treatment required—ambulant, bed rest, hospital (surgical), with eventually a residue of resistant cases, so-called 'chronics', i.e. cases not responding satisfactorily to treatment. This linkage between the SANTA 'centre', the diagnostic tuberculosis clinic which feeds it, and its corresponding chest hospital, fulfils a most important function in the general control scheme—logical and basic as in the original Edinburgh plan, and the results are as satisfactory.

Apart from its function of providing less expensive (so-called 'austerity') beds, SANTA's chief role is (1) to study the distribution of tuberculosis throughout the Union, (2) to plan and decide the location of its centres in close collaboration with Union Health Department and local authorities, and (3) to keep the public informed of its responsibilities in respect of tuberculosis, acting thus in the manner of a catalyst and a stimulator of the public conscience.

SANTA's record in the 7-year period is as follows: 17,000 patients treated, 10,000 persons returned home improved, 2,700 deteriorated cases transferred to hospitals, 2,500 patients absconded or discharged for misconduct, 500 patients lost by death, and 1,000 chronics remaining to occupy 1/6th of the beds. Soon 6,000 beds will be available, and then SANTA hopes to return as 'arrested' 4,500 cases annually.

Life in a centre is by no means an idle one; every endeavour is made to rehabilitate the patient and gradually to condition him to re-enter a line of gainful occupation on the happy day of his discharge. To this end approaches are made to chambers of industry, large employers, industrialists, farmers and agricultural employers to re-engage arrested cases that are now safe prospects and free from infection.

There remains the problem of the support of the family and dependants whilst the breadwinner is under treatment. For this purpose SANTA and allied care committees administer and distribute grants in payment of rent and towards food supplements, administering also grants from the Social Welfare and Child Welfare departments of the State. At the present time SANTA spends approximately £70,000 *per annum* in providing care work

covering approximately 6,000 patients and 12,000 of their dependants, but in order to carry out care work on an adequate and effective scale, a sum of the order of £200,000 *per annum* should be spent.

Our control system also makes provision for safeguarding child contacts, especially during the absence of one or both tuberculous parents. Such children are provided for in 'Sunshine Homes' supported by the Christmas Stamp Fund. Their general health and resistance is thus built up so that there is less danger of their becoming clinical or active cases of tuberculosis in later life. The results of this preventive work have been outstandingly good. The first 'Sunshine Home' was opened in Bellville in 1930, and its methods have provided the high standard which have given such satisfaction.

We are beginning to use BCG with which, by a vaccinating process, we can raise the resistance of susceptibles and of those whose work exposes them to greater risks of infection—nurses, doctors, students. Scandinavia, Denmark and Holland have pointed the way with encouraging results, and other countries with mixed populations like Uruguay and Argentine are following.

OUTLOOK FOR THE FUTURE

Such then, briefly, is the picture of our efforts to control tuberculosis in South Africa today. What can we say of the future? If it is unrewarding to speculate on how the first acid-fast saprophyte became a dangerous parasite, we might more profitably consider how to defeat the 'mutant' types of bacillus which now appear to resist antibiotic treatment. This line of research is being actively pursued in many research stations with hopeful results. Let me explain. The disappointment in the antibiotics we have available lies in the fact that they are not sufficiently lethal to the tubercle bacillus, which in some cases develops 'mutant' forms which resist extermination and defy the action of the drugs. This has caused the development of a type of chronic disease in certain cases, against which we are almost powerless. This means that we must segregate or isolate our chronic cases. France has already used some of her sanatoria which were nearly emptied after the introduction of the new chemotherapy, for this purpose.

The discovery of the longed-for *remedia magna sterilisans* that will constantly kill the tubercle bacillus may occur in the next few decades, but, having regard to the complexities of the whole problem of tuberculosis and its intimate association with environment, that is, with housing, with nutrition, and with stress at work, we dare not relax in a single element of our all-embracing scheme of control.

In the Union our first steps towards control consisted of providing sanatorium beds instead of 'dispensaries' or clinics—which is the nucleus of the Edinburgh scheme. Now that radiology has assumed so important a role in diagnosis, the emphasis of our campaign has reverted to the tuberculosis clinic, and so with ambulant and earlier cases to deal with we find that the SANTA type of austerity beds function admirably. Selective treatment of the sorted cases is proceeding continuously at the centres, whence cases go to the hospital for surgical accessory treatment, or back to the clinic for a final spell of supervision in their homes as outpatients, or to the sanatorium, still to be fitted into our scheme for 'chronic' cases.

The effectiveness of our so-called 'austerity' beds in SANTA centres is made possible by our climatic conditions. They replace the more expensive sanatorium or hospital type of bed found in Europe. In the Netherlands the demand for beds has declined by more than 50% in the last 7 years. This is an indication of the effectiveness of their control system in its application of early diagnosis resulting in quick control and early recovery. The machinery for the control of tuberculosis in the Netherlands has operated so successfully during the last decade that it might well be said that the complete control of tuberculosis in that country is in sight.

And so might it eventually work out for us too in the Union if we will but have faith to push along the accepted lines of co-ordinated control. Given sufficient support in the form of full financial backing and the active cooperation of every enlightened citizen, we can move forward confident that it will be possible to halt the progress of this protean disease. I feel that sooner or later science will place in our hands perfected weapons so that maybe the centenary of the discovery of the tubercle bacillus may also see its complete capitulation to our fully organized and determined attacks.

I wish to thank Dr. E. D. Cooper, Medical Officer of Health, City of Cape Town, for his courtesy and assistance: his statistical department supplied the figures on which Fig. 1 is based.

THE RELATIONSHIP OF SMOKING TO ISCHAEMIC HEART DISEASE*

1. POSSIBLE MECHANISMS

B. BRONTE-STEWART, M.D., M.R.C.P., *Department of Medicine, University of Cape Town and Groote Schuur Hospital*

Two independent surveys on lung cancer revealed, as an incidental finding, that heavy cigarette smokers had a higher mortality from ischaemic heart disease than non-smokers. Many of the epidemiological features of ischaemic heart disease can be explained by differences in cigarette smoking habits. The possible mechanisms for these effects might arise through a direct effect of smoking on the coronary circulation or myocardial function or the mechanism may operate indirectly in that cigarette smoking and mortality from ischaemic heart disease may be related to a third and common factor. Apart from causing a rise in blood pressure and pulse rate, there is no evidence to suggest that the smoking of a cigarette affects coronary blood flow. In seeking an indirect association, 300 adult men of the Cape Coloured and European communities of Cape Town were analysed. Heavy cigarette smoking amongst them was not related to occupation, body-build, degree of obesity or the height of the blood pressure. Consistent differences were however, seen in the serum lipids. In each race, at each age group and in each economic class the heavy smokers had the cholesterol distribution between the alpha and beta lipoproteins resembling that found in patients with ischaemic heart disease. These findings led to the analysis of the dietary fat intakes of these groups, and in parallel with the cholesterol differences ran differences in dietary fat consumption in that the heavy smokers consumed more fat than the non-smokers. These dietary data however, were really semi-quantitative but owing to their consistency, the hypothesis arose that smoking might have an effect on food preferences *via* the taste mechanism. This hypothesis was tested in the following reports.

* Abstracts of papers presented at Research Forum, University of Cape Town, 30 March 1960.

2. TASTE THRESHOLDS

L. H. KRUT, M.B., CH.B., *Department of Medicine, University of Cape Town and Groote Schuur Hospital*

Cigarette smokers and non-smokers were sampled in two separate groups; young medical students and older insurance personnel. The individual who performed the tasting tests was unaware whether the subject was a smoker or non-smoker. Similar results were obtained in both samples. There were no significant differences in the taste thresholds of smokers and non-smokers with respect to salt, sour and sweet. Highly significant differences however, existed with regard to bitter in that the group of cigarette smokers had a higher taste threshold for quinine solutions than the non-smokers. Tests were also conducted immediately before and immediately after the smoking of a cigarette in the smokers and in the non-smokers, a similar period of time was allowed to elapse before retesting. No significant differences were found. These tests therefore, showed a general overall reproducibility. These individuals were then subjected to tests with phenylthiocarbamide (PTC) as their failure to taste bitter was possibly genetically transmitted. No correlation however existed and the distribution of PTC tasters were similar in both the non-smoker and smoker samples. It was concluded that taste with respect to bitter, was affected in cigarette smokers.

3. FOOD PREFERENCES

MONICA J. PERRIN, B.Sc., DIP. DIET. (EDIN.), *Department of Medicine, University of Cape Town and Groote Schuur Hospital*

It remained to be seen whether the taste differences shown had any effect in determining food preferences. The 150 individuals who were subjected to the tasting tests above were questioned about their diet and the fat content of these diets was analysed. As in the initial survey, it was shown that heavy cigarette smokers consumed more fat than non-smokers but the differences were small. From these 150, two small samples were chosen by random selection for detailed dietary investigation. Information was obtained by recall paying particular attention not only to the daily intake but that over weekends as well. Again the differences were shown in that heavy cigarette smokers consumed more fat than the non-smokers. The differences however, were not statistically significant. On more detailed examination however, marked differences existed in the types of foods that constituted the overall fat intake in these two groups. Heavy smokers consumed significantly more meat and eggs than did non-smokers but non-smokers consumed more fat in the form of cakes, sweets and chocolates. There was a high degree of consistency in that both samples showed similar findings. It was concluded that in these samples cigarette smoking affected food preferences.

These studies were supported in part by research grants from the National Heart Institute, USA (PHS: H-3316), the South African Council for Scientific and Industrial Research, and the Tobacco Industries Research Committee of the USA.

PROFESSIONAL PROVIDENT SOCIETY OF SOUTH AFRICA

EXTRACT FROM THE ANNUAL REPORT AND BALANCE SHEET 1959

Examination of the Society's recently published Report and Accounts reveals another year of outstanding progress. The income for the year rose steeply by over £53,000 to exceed £165,000. In addition it collected well over £40,000 in premiums on its additional optional benefits which, less commissions, was paid to the underwriting companies. Over £16,000 or 11·95% of the subscription income was paid out in sick-pay claims, approximately 10% of the members having received substantial benefits. The administration costs at 5·81% of the total income were remarkably low.

After providing for claims and administration costs, the amount available for distribution to members in interest and dividend credits totalled approximately £137,000, or 84% of the total income. The interest credits to members' apportionment accounts was at the rate of 5·92%—the average rate of interest earned on the Society's investments. The dividend credits were at the rate of 2s. 7·03d. per share per month, compared with the average subscription of 3s. per share per month, which means that members, as usual, obtained their cover against loss of income at an exceptionally reasonable rate.

The assets of the Society at the end of 1959 stood at £536,337, an increase of £163,108 since the end of 1958. The investment portfolio reflects a very sound position. Some £312,606 was invested in gilt-edged securities, representing 59·6% of the total invested funds, nearly 20% more than the statutory minimum required. £151,642, or 28·9%, was invested in loans secured by first mortgage and £60,202, or 11·5%, in first mortgage debentures, building societies, and loans to members. The average of 5·92% earned by these investments, particularly in view of the high proportion invested in gilt-edged stocks, is most satisfactory.

New members admitted during the year numbered 532 and far surpassed all previous admission figures. The total membership at the end of the year was 1,954 holding 86,592 shares. This membership comprised 408 dentists, 1,022 doctors, 140 pharmacists, 88 advocates, 209 attorneys, 30 veterinary surgeons, 26 land surveyors, 13 architects and quantity surveyors and 18 chartered accountants. In spite of the rapid increase in membership, the Board pointed out that there are still many thousands in the eligible professions who could benefit greatly by joining the Society, and appealed to existing members, who are in the most favourable position to do so, to convince their colleagues of the security and protection membership will afford them and their dependants.

The Society's group life assurance scheme, which provides cover until death regardless of whether this occurs after the retirement age is reached, has received support from approximately 70% of the members, who hold an aggregate sum assured of nearly £6,000,000 under the scheme. The premiums paid during the first year of the scheme exceeded claims, administration costs, and the percentage allocated for reserves by £21,802. This amount was paid to the Society by the underwriting company against the possible profits to be determined at the end of the first triennium of the scheme. Some 70% of the members are also participating in the hospitalization scheme, launched at the same time, and the need for this scheme has been fully substantiated by the claims experience. The Society is at present negotiating for the extension of this scheme to embrace a full medical insurance scheme.

The tax concessions in respect of contributions by self-employed persons to approved pension schemes, announced by the Minister of Finance in his budget speech, is claimed in large measure to be due to the efforts of the Society, supported in this by the majority of the professions whose members are eligible for membership of the Society. These concessions now make it possible for the Society to proceed with its plans to establish a suitable pension scheme, details of which are to be published shortly. It is the intention to make this scheme available to all members of the associated professional organizations regardless of whether or not they participate in the other schemes offered by the Society.

From its very modest beginnings just 19 years ago, the Society has grown to be the most important institution providing for the specific needs of professional men. Its continued growth can only add to the comprehensive protection already given and increase the measure of stability within the professions.

MEDICAL PRACTITIONERS OF UNKNOWN ADDRESS

The Registrar of the South African Medical and Dental Council has supplied the subjoined list of medical practitioners to whom communications addressed by the Registrar have been returned by the Post Office because delivery could not be effected. Attempts to trace these practitioners have failed. Their attention is invited to the following sections of the Medical, Dental and Pharmacy Act, 1928:

Section 16 (2). It shall be the duty of every registered person who changes his address to intimate the fact to the Registrar within one month after such change.

Section 17 (1). The Council may erase from the Register the name of any person who . . . (*b*) has failed, within a period of three months from the date of an enquiry sent by the Registrar by registered letter to the address appearing on the Register in respect of him, to notify the Registrar of his present address.

Section 17 (3). No person whose name has been erased in accordance with this section . . . shall be deemed to be registered unless and until on application being made by him to the Registrar, his name has been restored to the Register.

N.B. In case the practitioners concerned do not see this notice, friends who may know their present whereabouts are asked to advise them of the need to act immediately, since the Council would like to avoid, as far as possible, applying the sanctions of the Act.

Braude, William
Brooks, Dorothy
Dippenaar, Johannes Marthinus Petrus
Molk, Reuben Charles
Mulvany, Kathleen Joyce
Patterson, Alexander John
Scribante, Albertus van Wyk
Sechiari, Giles Pandely
Van Rensburg, Wessel Hendrik Janse
Watson, Ian France

EIGHTEENTH ANNUAL HEALTH CONGRESS, BLOEMFONTEIN, 11-14 OCTOBER 1960

The General Council of the Institute of Public Health (formerly the Health Officials' Association of Southern Africa) has announced that the 18th Annual Health Congress will be held in the City Hall, Bloemfontein, from 11 to 14 October 1960.

The Congress will be opened by the Administrator of the Orange Free State, the Honourable J. W. du Plessis. The year 1960 marks not only the change of name from an Association to an Institute, but it is also the Diamond Jubilee Anniversary of the Association's foundation in Cape Town in 1900.

At this Congress, papers will be read by persons who are specialists in their field, on matters of prime importance to public health. Ample time will be allowed for discussion after each paper and, in addition, one session will be set aside for discussion on any public health subject which delegates may desire to raise.

The fee for delegates is £4 4s. 0d. Further information may be obtained from Mr. H. M. Downes, Hon. Congress Secretary, P.O. Box 1499, Bloemfontein, O.F.S.

The provisional programme for the Congress is as follows:

'Future trends in public health', Dr. J. J. du Pré le Roux, Secretary for Health, Union Government.

'The health visitor's role in family visiting', Miss A. A. Graham, *O.B.E.*, Principal Nursing Officer, Northumberland, England.

'Administration of health on the mines', Miss G. Moore, Technical Assistant, Anglo American Co. of S.A., Ltd.

'Public health implications of rheumatic fever', Dr. J. L. Braudo, paediatrician, Johannesburg.

'Public health implications of infectious hepatitis', Dr. J. H. S. Gear, Director, South African Institute for Medical Research, Johannesburg.

'The part existing health services may be expected to play in the event of a future nuclear war'. Col. E. C. Raymond, Surgeon-General, Union Defence Force.

'Abattoir construction and administration', Mr. T. E. de Necker, Abattoir Superintendent, Bloemfontein.

'The Water Act and its implications in so far as local authorities and industry are concerned', Mr. P. K. Goosen, Director of Water Affairs, Union Government (or a member of his staff).

'Alcohol and the alcohol addict', Dr. H. M. Wolfsohn, Medical Officer of Health, Kimberley.

'Sociology and public health', Prof. S. P. Cilliers, University of Stellenbosch.

IN DIE VERBYGAAN : PASSING EVENTS

Mr. Braeme Goldman, F.R.C.S. (Eng.), has recently returned to Cape Town after spending 3 months in the USA, where he confined his work to stapes surgery at the Mount Sinai Hospital, New York, and the Henry Ford Hospital, Detroit.

Dr. Braeme Goldman, F.R.C.S. (Eng.), het onlangs teruggekeer na Kaapstad nadat by 3 maande in die V.S.A. deurgebring het, waar hy hom op die chirurgie van die stapes toegelê het aan die Mount Sinai-hospitaal, Nieu-York, en die Henry Ford-hospitaal, Detroit.

* * *

Southern Transvaal Branch (M.A.S.A.). Prof. O. S. Heyns will give a lecture to the members of the Southern Transvaal Branch of the Medical Association on Tuesday 21 June at 8.15 p.m. The subject will be 'The facilitation of labour by abdominal decompression'. Members of the Medical Graduates Association of the University of the Witwatersrand and senior medical students are invited to attend this lecture.

* * *

Society for Clinical and Experimental Hypnosis of South Africa (Southern Section). The next meeting of this Society will be held on Tuesday 14 June at 8.15 p.m. in the E-floor Lecture Theatre, Groote Schuur Hospital, Observatory, Cape. Mr. A. M. Michael will speak on 'The induction of hypnosis and conditioning of the patient during pregnancy'; and Dr. R. E. Viljoen will demonstrate 'The induction phase', which will then be discussed by a panel.

* * *

Society for Endocrinology, Metabolism and Diabetes of Southern Africa. The first Annual Meeting of this Society will take place on Thursday 7 July at 5.45 p.m. in the Harveian Lecture Theatre, Johannesburg. Anyone who is interested in joining the Society is invited to attend the meeting. Membership of the Society is not confined to specialists, but is open to all doctors and scientists interested in these fields. The first scientific meeting of the Society will be held in conjunction with the second scientific meeting of the Association of Physicians of South Africa. At this meeting papers on diabetes and thyroid disorders will be read and it will take place at 2 p.m. on 7 July.

* * *

Dr. Desmond K. Quinlan, M.B., B.Ch. (Rand), L.M. (Dubl.), Dip. O. & G. (Rand), F.C.O. and G. (S.A.), formerly senior lecturer in obstetrics and gynaecology at the University of Natal, has commenced specialist practice at 803 Rand Central, 165 Jeppe Street, Johannesburg, and at 113 Medical Arcade, Krugersdorp. Telephones: Johannesburg 23-1484, Krugersdorp 660-1478, residence 41-1546, emergency 22-4191.

Dr. Desmond K. Quinlan, M.B., B.Ch. (Rand), L.M. (Dubl.), Dip. O. & G. (Rand), L.K.V. en G. (S.A.), voorheen senior lektor in verloskunde en ginekologie, Universiteit van Natal, praktiseer nou as 'n spesialis te Rand Central 803, Jeppestraat 165, Johannesburg, en Medical Arcade 113, Krugersdorp. Telefone: Johannesburg 23-1484, Krugersdorp 660-1478, woning 41-1546, nooduproepe 22-4191.

* * *

South African Mothercraft Training Centre, Claremont, Cape. The annual meeting was held at the Centre on 19 May, when Dr. Lance Impey was the chief speaker.

This centre, conducted by the Society for the Protection of Child Life, Cape Town, provides a resident postgraduate course in mothercraft for qualified nurses (4 months) and midwives (6 months), who are trained to assist mothers in maintaining healthy pregnancy and satisfactory breast feeding and to keep the normal baby healthy, and in the prevention of prejudicial dietetic conditions. The students are paid during training and on passing the examination receive the certificate of Athlone Mothercraft Nurse, a registrable 'additional qualification' under the Nursing Act. Over 750 nurses have taken the certificate since the centre was opened in 1925. Many of them are employed by the Union Health Department, provincial administrations, municipalities and voluntary agencies.

The Centre includes the Struben Memorial Home, a dietetic hospital of 22 beds where infants under 1 year suffering from dietetic disorders or needing specialized care, e.g. premature babies, are admitted for treatment, and also mothers experiencing difficulty with breast feeding. Fees are charged when patients are in a position to pay, but only 20% of cases pay full fees and 25% are treated free. The institution is subsidized by the Government and Cape Town municipality, but is mainly supported by voluntary effort.

The students also receive training at infant welfare sessions maintained by the Centre and in the adjoining Lady Buxton Home, an emergency home for children up to 6 years old.

* * *

South African Paediatric Association, Cape Town Sub-Group. The next meeting of this Sub-Group will be held on Tuesday 21 June at 8.15 p.m. in the Lecture Theatre, Red Cross War Memorial Children's Hospital, Rondebosch, Cape. Dr. Maurice Berman will speak on 'Orthodontics'. Visitors are welcome to attend this meeting.

* * *

Research Forum, University of Cape Town. The next meeting of Research Forum will be held on Wednesday 15 June at 12 noon in the Bennie de Wet Lecture Theatre, A-floor, Groote Schuur Hospital, Observatory, Cape. Dr. I. Bouchier will speak on 'The fat-tolerance test: An inter-racial survey of the effect of a high fat meal with particular reference to ischaemic heart disease. All who are interested are invited to attend this meeting.

South African Institute for Medical Research, Johannesburg, Staff Scientific Meeting. The next meeting will be held on Monday 20 June at 5.10 p.m. in the Institute Lecture Theatre. Prof. B. J. P. Becker will speak on 'Liver disease, alcohol and atheromatosis'.

* * *

Prof. L. Eales, of Cape Town, was elected to the Fellowship of the Royal College of Physicians of London on 28 April. He was admitted to the Fellowship of the College at the comitia held on 28 May 1960, *in absentia*.

* * *

The following specialists in *Klerksdorp* wish to notify their colleagues of their new telephone numbers:

Bailey, N., obstetrician and gynaecologist, rooms 2-3136, residence 2-3136, if no reply 2-5411.

Catzel, P., paediatrician, rooms 2-4027, residence 2-3328, if no reply 2-5411.

Coetzee, C. H., SAIMR pathologist, laboratory 2-4751/2, residence 2-5324.

Frame, A., physician, rooms 2-1911, residence 2-1911.

Mason, E. I. H., surgeon, rooms 2-4611, residence 2-3067, if no reply 2-5411.

Marcus, E., anaesthetist, rooms 2-5678, residence 2-5960, if no reply 2-5411.

Meter, M. J., orthopaedic surgeon, rooms 2-5934, residence 2-3056, if no reply 2-5411.

Meyer, J. M. D., ophthalmologist, rooms, 2-4811, residence 2-2255, if no reply 2-5411.

Muller, W. H., obstetrician and gynaecologist, rooms 2-3665, residence 2-5067, if no reply 2-5411.

Oosthuizen, J. G. M., physician, rooms 2-3336, residence 2-5134, if no reply 2-5411.

Rabie, C. J., radiologist, rooms 2-5859, residence 2-5338, if no reply 2-5411.

Sandler, A., physician, rooms 2-1911, residence 2-2323, if no reply 2-5411.

Sparrow, E. M., surgeon, rooms, 2-2275, residence 2-4417.

van der Merwe, I., radiologist, rooms, 2-5037, residence 2-3131, if no reply 2-5411.

van Wyk, G. P., surgeon, rooms 2-2939, residence 2-2870, if no reply 2-5411.

Visser, P. F., ear, nose and throat surgeon, rooms 2-4629, residence 2-5871, if no reply 2-5411.

DIE LIEFDADIGHEIDSFONDS : THE BENEVOLENT FUND

Met dank word die volgende skenkings gedurende die maande Maart en April 1960 erken:
The following donations during March and April 1960 are gratefully acknowledged:

Geloftekaarte ter Nagedagtenis aan: Votive Cards in Memory of:

Dr. M. T. M. Wolfaard *by* Dr. W. H. Opie; Mrs. Connie McLean *by* Medical Wives Association; Dr. G. W. Brammer *by* Dr. J. Tasker; Mrs. C. Maggs *by* Mr. M. Lautre; Dr. E. J. Papenfus *by* Mrs. H. Morton, Mr. and Mrs. Stonefield, Barton, Mayhew Ryder & Co., Mrs. C. R. Wilson, Mrs. M. Murray, Boksburg Bowling Club (Ladies Section), Dr. D. L. Ovedoff, Mr. and Mrs. H. Riley, Mr. D. Clarke, Ailsa, Mervyn and Shirley, Dr. H. Flight, Mr. and Mrs. C. J. Goedhals and family, Drs. Turton, Vosloo, Nienaber and Esterhuizen, Frieda and Louis van Zyl, Mr. Sheriton, Dr. G. B. Moffatt, Drs. E. and F. E. Meltzer, Matron, Boksburg-Benoni Hospital, Mr. and Mrs. S. Papenfus, Mrs. O. Exter, Mrs. S. du Bruyn, Mr. and Mrs. S. Exter, and Dr. C. L. Botha; Mrs. L. Kellaway *by* Dr. H. O. Hofmeyr; Dr. Shanks *by* Ronald and Margaret Heald; Dr. J. Pratt-Johnson *by* Dr. A. J. Orenstein; Mrs. J. C. duP. Le Roux *by* Dr. A. W. Sichel; and Mrs. L. Fisher *by* Dr. Shirley Cole.

Totaal Ontvang van Geloftekaarte: £41 5s. 0d.
Total Received from Votive Cards:

Dienste Gelewer aan: Services Rendered to:

Dr. H. W. Dyke *by* Dr. D. W. Burton, Drs. J. K. McCabe and B. Navid and Dr. R. J. P. Melvin.

Mrs. E. R. Dyke *by* Dr. D. W. Burton, Drs. J. K. McCabe and B. Navid and Dr. R. J. P. Melvin.

Seun van dr. M. Swart *deur* dr. I. Gordon, drs. Lee en Wynne en dr. R. A. Moore Dyke.

Late Dr. T. Mulock-Bentley *by* Drs. E. W. S. Deale, T. Armstrong, P. Jackson and M. Larsen.

Dr. N. Spektor *by* Dr. W. G. Davis.

Mevr. Verschuur en twee seuns *deur* drs. F. D. du Toit en H. J. Basson.

Dr. J. H. H. Pirie

Mevr. A. M. Botha *deur* Dr. S. Etzine.

Mrs. J. Bernitz *by* Dr. P. Marchand.

Charlotte Theron Kinderhuis *deur* drs. H. L. Dippenaar, O. du Preez, J. Gilliland, P. J. Grobler, R. Joyce, A. F. Marais, E. A. Marais, J. C. Koornhof, H. Tobias en J. P. A. Venter.

Daughter of Dr. E. D. Esser *by* Dr. F. D. duT. Van Zyl.

Wife of Dr. L. Cooper *by* Dr. M. Feldman.

Dr. C. F. Krige *deur* mnr. E. B. H. Trehair en drs. A. L. Agranat en K. H. Jooste.

Totaal Ontvang vir Dienste Gelewer:
Total Received from Services Rendered: £314 18s. 0d.

Skenkings: Donations:

Drs. C. L. L. Murray, A. L. Wilson, D. S. Palmer, S. Kahn, J. P. Beazley, A. C. L. Grantham, S. Stein, M. J. Cohen, C. L. Lauf, J. J. Brummer, C. C. Haupt, B. A. Armitage, R. R. Richards, E. Briggs, M. E. Meyrick, C. Krausey, M. G. Erasmus, R. W. Nash, J. H. Boshoff, F. A. van Heerden, L. H. Botha, I. Friedman, M. A. Lloyd, M. S. Grove, P. J. Grobler, D. T. Trotman-Pitt, E. T. Dietrich, J. J. Lawrence, J. K. McKechnie, W. E. Leith, A. G. Cheyne, R. T. Vaughan, R. R. Mackenzie, J. A. V. van Zyl, W. R. Hackman, A. L. Forbes, J. H. Jackson, H. H. Stokmanns, J. C. W. Ehlers, J. Mibashan, R. St. Sinclair, J. Smith, H. A. Kalley, and P. S. Meyrick.

	£	s.	d.
Totaal: Total	24	7	0
Dr. A. G. Garnham	2	2	0
Dr. F. Reinhold	1	11	6
Dr. T. S. Eddy	2	2	0
Dr. J. A. Currie	2	8	6
Dr. H. H. Bloch	2	2	0
Dr. J. K. McCabe	2	2	0
Dr. B. Navid	2	2	0
Drs. Nieuwoudt and Gilliland	4	4	0
Dr. M. Symon	2	2	0
Drs. King, Prinsloo and Booyse	6	6	0
Dr. H. S. Botha	2	2	0
Drs. Jooste, Leonard, Grundlingh and Fergus	4	4	0
Medical Wives Association	30	0	0
Cape Western Branch (M.A.S.A.) Collection box	12	3	6
Cape Western Branch (M.A.S.A.) Film première	575	7	0
Totaal Skenkings: Total Donations	£675	5	6

Groot Totaal: Grand Total: £1,031 8s. 6d.

HON. TREASURER'S APPEAL FUND

Dr. J. A. Louw £2 2 0

NUWE PREPARATE EN TOESTELLE : NEW PREPARATIONS AND APPLIANCES

ARGYROL S.S.

Westdene Products (Pty.) Ltd. announce the introduction of a stable 10% solution of genuine Argyrol, and supply the following information:

The wide consistent antimicrobial action of Argyrol has stood the test of time and has been confirmed by recent studies. Concentrations as low as 5 - 20 parts per million are completely inhibitory against common Gram-positive and Gram-negative organisms including the difficult-to-eradicate proteus and pseudomonas. The fact that resistance does not develop is becoming of increasing

importance. In addition Argyrol has a soothing and healing action on inflamed and infected mucous membrane.

Normally solutions of silver do not retain their efficacy and mildness over long periods. However, Argyrol S.S. (stabilized solution) remains potent throughout the entire course of treatment and indefinitely thereafter. The superior therapeutic qualities of Argyrol, the original mild silver proteinate, are the result of definite physical and chemical properties which differentiate it from other products of this type. Argyrol contains silver in a much finer state of colloidal subdivision and the protein radical is specifically adapted for its purpose.

Argyrol S.S. is indicated in infections of the eye, ear, nose and throat, and for genito-urinary tract infections. It is available in ½-oz. dropper bottles, and further information may be obtained from the sole South African distributors, Westdene Products (Pty.) Ltd., P.O. Box 7710, Johannesburg.

VALLEDRINE

Maybaker (S.A.) (Pty.) Ltd. announce the introduction of Valledrine brand cough linctus which contains in each fluid drachm (3·6 c.c.) of a flavoured vehicle trimeprazine tartrate 2·5 mg., pholcodine citrate 4 mg. and ephedrine hydrochloride 7·5 mg.

Valledrine is intended for use in relieving coughs of various types, including the refractory post-influenzal type and those associated with bronchospasm and bronchitis. It is particularly useful in allaying the unproductive, irritating cough which is troublesome in many patients, especially at night. It also exerts a beneficial effect in relieving the spasm of whooping cough.

Valledrine is supplied in bottles containing 4 fl. oz. and 25 fl. oz.

PROHEPARUM

Noristan Laboratories (Pty.) Ltd. introduce Proheparum, which contains hydrolysate of whole, fresh liver, essential amino-acids, choline, cysteine, inositol and Vitamin B 12, and supply the following information:

Proheparum is indicated in the treatment of hepatic diseases such as chronic hepatitis and cirrhosis, and is valuable as a protective agent against intoxications of the liver, especially in alcoholics. Clinical investigations have proved that liver-function tests often improve, ascities may be diminished and patients gain weight.

Proheparum is non-toxic; the tablets are easy and pleasant to take, and should be given over a sufficiently long period. Proheparum is available as tablets, in bottles of 50, 200 and 500 tablets, and the price is very reasonable.

Further details are obtainable from Noristan Laboratories (Pty.) Ltd., P.O. Box 78, Silverton, Transvaal.

BOEKBESPREKINGS : BOOK REVIEWS

BLINDNESS IN WEST AFRICA

Blindness in West Africa. By F. C. Rodger, M.D., Ch.M., D.O.M.S. Pp. xiv, 262. 1 colour plate. 6 maps. 96 text figures. 70s. net. London: H. K. Lewis & Co. Ltd. 1959.

This monograph reports the work of a team charged with the task of assessing the nature and incidence of blindness and its causes among the 12 million inhabitants of a vast track of West Africa. An important part of the task was a detailed investigation of the common but less well-known disease of onchocerciasis.

A description is given of the area and its people and previous surveys are discussed. Briefly the findings of the team are as follows: The number of cases of blindness is estimated to be about 200,000. In the area as a whole, the main causes are trachoma, senile cataract, and specific exanthemata. Where onchocerciasis is hyperendemic this disease becomes the main cause. It was also thought that malnutrition plays an important role.

The statistical treatment of the data is sophisticated. The assessments are based on 'random' samples but the author does not elaborate on how the samples were obtained. The question of reliability of diagnosis is not discussed.

This is an outstanding book, beautifully produced and illustrated. It is confidently recommended to specialists, general readers, and anyone interested in epidemiology in Africa.

A.M.A.

PSYCHIATRY AND PUBLIC HEALTH

Psychiatry and the Public Health. University of London Heath Clark Lectures 1957 delivered at The London School of Hygiene and Tropical Medicine. By G. R. Hargreaves. Pp. 118. 18s. London, New York, Toronto: Oxford University Press. 1958.

The author is Professor of Psychiatry at the University of Leeds. That a psychiatrist is called upon to contribute to a lecture series on the history and progress of preventive medicine indicates the growing realization by those responsible for maintaining public health how great is the significance of psychiatric disorder. This is accepted by the author, who believes that if schizophrenia is to be brought under control, as cholera was in the last century, it will be by the type of social action known as public-health practice.

With the gradual evolution of the medical discipline of psychiatry, true hospitals for the mentally ill developed during the 19th century. But by the early 20th century the 'mental hospitals' were housing thousands of chronic irrecoverable patients (who had previously been housed in workhouses), and the care of the mentally ill remained apart from the general body of medicine.

As in some countries in recent years a closer relationship has developed between psychiatric and general hospitals, and between psychiatrists and physicians, great community advances have been made in the treatment of mental illness. Moreover, psychoneurotic patients, who in former centuries had to seek treatment from a physician or a paramedical 'healer', became recognized as requiring psychiatric care. The province of psychiatry was swollen still further with educational advance and the clearer recognition of varying grades of mental defectiveness. Finally, the child-guidance movement, concerned originally with delinquency, altered the practice of psychiatry so that now treatment can only be provided adequately by a therapeutic team of psychiatrist, psychologist and social worker in active and continuing contact with the resources of the community in which they work. With the concept of psychosomatic medicine the gap which used to exist between psychiatry and general medicine has been filled.

Tracing this development with clarity and erudition, Hargreaves concludes that it is the local health authority who must accept the new frontier in public-health practice—the restoration to social effectiveness of the mentally ill and the promotion of mental health in the community.

H.W.

SURGERY OF BONE AND JOINT TUBERCULOSIS

Surgical Treatment of Bone and Joint Tuberculosis. By R. Roaf, M.A., M.Ch.Orth., F.R.C.S.Ed., F.R.C.S.Eng., W. H. Kirkaldy-Willis, M.A., M.D., B.Chir., F.R.C.S.Ed. and A. J. M. Cathro, M.B., Ch.B. Pp. viii + 137. 90 figures. 30s. net. + 1s. 7d. postage abroad. Edinburgh and London: E. & S. Livingstone Ltd. 1959.

This slim volume is packed full of valuable information written in concise, excellent English. The experience of the authors, who have seen and managed a vast amount of bone and joint tuberculosis, is of particular interest to South African orthopaedic surgeons because most of their clinical material has been African. In South Africa one is aware that the type and course of bone and joint tuberculosis are different from what is encountered in Great Britain.

The use of streptomycin and other ancillary drugs has made direct operative opening of a tuberculous focus a safe procedure. Consequently, today, treatment is measured in terms of months and not years, and we aim primarily at mobility of a joint, and not 'rigidity', wherever possible. These principles are well supported by the authors' analysis of the Kenya patients.

Throughout the book there is a balanced judicious approach to the question of operative interference. It is stressed in several places that in synovial tuberculosis conservative treatment yields better results. This has been the experience of the reviewer in South Africa.

The operative procedures are clearly described and well illus-

trated and most of the radiographs have reproduced remarkably well.

The foreword aptly states that the book will serve as a needed guide for surgeons who frequently treat bone and joint tuberculosis, and as an excellent reference for those who treat the condition occasionally. M.S.

PHYSIOPATHOLOGY OF THE LEUCOCYTES

Physiologie und Physiopathologie der weissen Blutzellen. Von H. Braunsteiner, G. Brecher, H. Brücher, E. P. Cronkite, H. Dittrich, F. Fey, H. v. Foerster, G. Grabner, A. Graffi, R. Gross, R. Höfer, W. Kosenow, P. Mieschер, F. Seelich und W. W. Smith. Herausgegeben von Univ.-Doz. Dr. H. Braunsteiner. Pp. viii + 346. 30 Abbildungen. Ganzleinen DM 59.00. Stuttgart: Georg Thieme Verlag. 1959.

The editor remarks in the preface that haematology mainly deals with the morphology of white blood cells, but that their physiology and pathological physiology are seldom mentioned in haematological text-books. It is to fill this gap that he has compiled this book in collaboration with 15 other authors.

There are chapters on eosinophils, basophils, mast cells, lymphocytes, neutrophils and plasma cells. Amongst the matters dealt with are the regulation of the number of white blood cells, and also antibodies, sex chromatin, congenital malformations of leucocytes, etc. As a whole the book furnishes an excellent review of the physiology of leucocytes; and in general the authors adopt the review approach and do not confine themselves to their own personal opinions. Every chapter is provided with an extensive bibliography; for example, there are 442 references on the subject of eosinophils.

While most of the contributions are excellent, variations in quality are apparent. This is inevitable, but the editor should try to reach some uniformity among his authors about basic questions such as whether in acute inflammation polymorphs or monocytes are the first cells to appear on the stage. This, however, is perhaps the reviewer's only criticism of this useful book. H.W.W.

THE FOUNDER OF THE BMA

The Life and Times of Sir Charles Hastings Founder of the British Medical Association. By William H. McMenemey, M.S., D.M., F.R.C.P., D.P.M. Pp. xii + 516. 32 illustrations. 50s. net + 2s. 7d. postage abroad. Edinburgh and London: E. & S. Livingstone Ltd. 1959.

The year 1958 marked the centenary of the passing of the Medical Act in England, and this book honours the man who probably had most to do with the placing of this Act on the Statute Book. In 1832 Dr. Charles Hastings, practising in Worcester, had founded an association of doctors which became the forerunner of the great British Medical Association. Known throughout the world, it became the 'parent body' of other medical associations, including our own.

This book tells the story of the life of a man who was devoted to the ideal of building up a strong professional body to be the guardian of the honour and interests of the profession and to bring about such reforms in both professional and public social life as were possible at the time. Amid much detail it gives an account of the life and personality of a great man and glimpses of the characters of some of his associates; in many ways it is a record of contemporary England.

Those who enjoy and appreciate medical history will not wish to miss this excellent account of the early beginnings of a great medical association and the life of its founder. A.H.T.

THE HAEMOGLOBINS

Abnormal Haemoglobins. A symposium organized by the Council for International Organizations of Medical Sciences, established under the joint auspices of UNESCO and WHO. Edited by J. H. P. Jonxis and J. F. Delafresnaye, CIOMS. Pp. ix + 427. Illustrations. 45s. Oxford: Blackwell Scientific Publications. 1959.

Although the behaviour differences of haemoglobin to denaturation by alkali have been known for almost a century, the demonstration by Pauling, Itano, Singer and Wells in 1949 that the haemoglobin in sickle-cell anaemia is electrophoretically abnormal, sparked off activity that was almost explosive. Haematologists, clinicians, geneticists, anthropologists, and chemists, applied themselves to the problems involved and within a mere decade no less than 12 different haemoglobins have been described and studied and, more recently, the heterogeneity of haemoglobin-A (Hb-A) has been established. A vast and somewhat scattered literature has accumulated as a consequence. The appearance of this volume is not only timely, but extremely welcome.

The first half of the volume concerns itself with a historical review, technical methods employed in identification, and criteria for interpretation and broadly with the individual haemoglobin syndromes. A chapter is included on different haemoglobin types in animals. The chapters are in the form of reviews by recognized authorities, with brief general discussions appended to some reviews. Bibliography is comprehensive up to 1957, with some references to work published during 1958.

The second half is broadly headed as the geography of haemoglobins, and is a portrayal of haemoglobin syndromes in various countries. The volume is concluded by a statement on the nomenclature of the more recently described haemoglobins.

Even though Hb-S and thalassaemia appear to be the only haemoglobin syndromes which are encountered in this country, this volume is invaluable as a source of reference and interest to pathologists, haematologists, physicians and biochemists, for the subject is in the stage of rapid development and the heterogeneity of Hb-A may have far-reaching consequences in clinical medicine. S.M.J.

SURGERY OF STOMACH AND DUODENUM

Surgery of the Stomach and Duodenum. A handbook of operative surgery. 3rd revised edition. By Claude E. Welch, M.D., D.Sc. (Hon.). Pp. 405. 83 plates. $9.75. Chicago: Year Book Publishers, Inc. 1959.

The 3rd edition of this illustrated handbook of surgery is proof of its popularity in the USA. It is meant primarily for surgical trainees as a ready reference to well established standard procedures of the stomach and duodenum. There is a description of each procedure opposite a series of line drawings. The illustrations are simple and easy to understand; most of them are self-explanatory. All the standard varieties of gastric and duodenal procedures are illustrated and described and the text, although brief, is clearly written and carries the stamp of authority and the experience of one of America's most eminent surgeons. The operations are those that have proved most satisfactory and are performed at Massachusetts General Hospital. There is a useful list of normal laboratory values and an extensive bibliography.

The book can be recommended as a useful reference for surgeons in training and as a guide for practising surgeons to operations of proven value. While not comparing with the larger illustrated volumes that have in recent years become available, it will nevertheless find a useful place in the surgeon's library. A.E.K.

INTERNATIONAL PHARMACOPOEIA : SUPPLEMENT

International Pharmacopoeia. 1st edition. Supplement. Pp. xx + 224. 25s. Published also in French. Spanish edition in preparation. Geneva: World Health Organization. 1959.

The Third World Health Assembly, in May 1950, approved the publication of the *International Pharmacopoeia.* Any member state of the WHO may include all or part of the work in its national requirements. The Pharmacopoeia has been of direct assistance to manufacturing laboratories and national administrations dealing with pharmaceutical preparations, and facilitates international commerce and therapeutics.

Vol. 1 contains 218 monographs and 43 appendices, vol. 2 217 monographs and 26 appendices, and this supplement under review 94 monographs and 17 appendices. The contents of these 3 volumes are now being examined for possible introduction into the second edition of the *International Pharmacopoeia,* which is now in preparation.

The supplement contains monographs on hormone preparations, antimalarials, contrast media, antibiotics, and many other drugs. A revised appendix deals with international biological standards. There are tables of usual doses for children and adults, and appendices on the preparation of isotonic solutions and buffer solutions and the determination of pH. Much useful and valuable information is to be found in the volume. N.S.